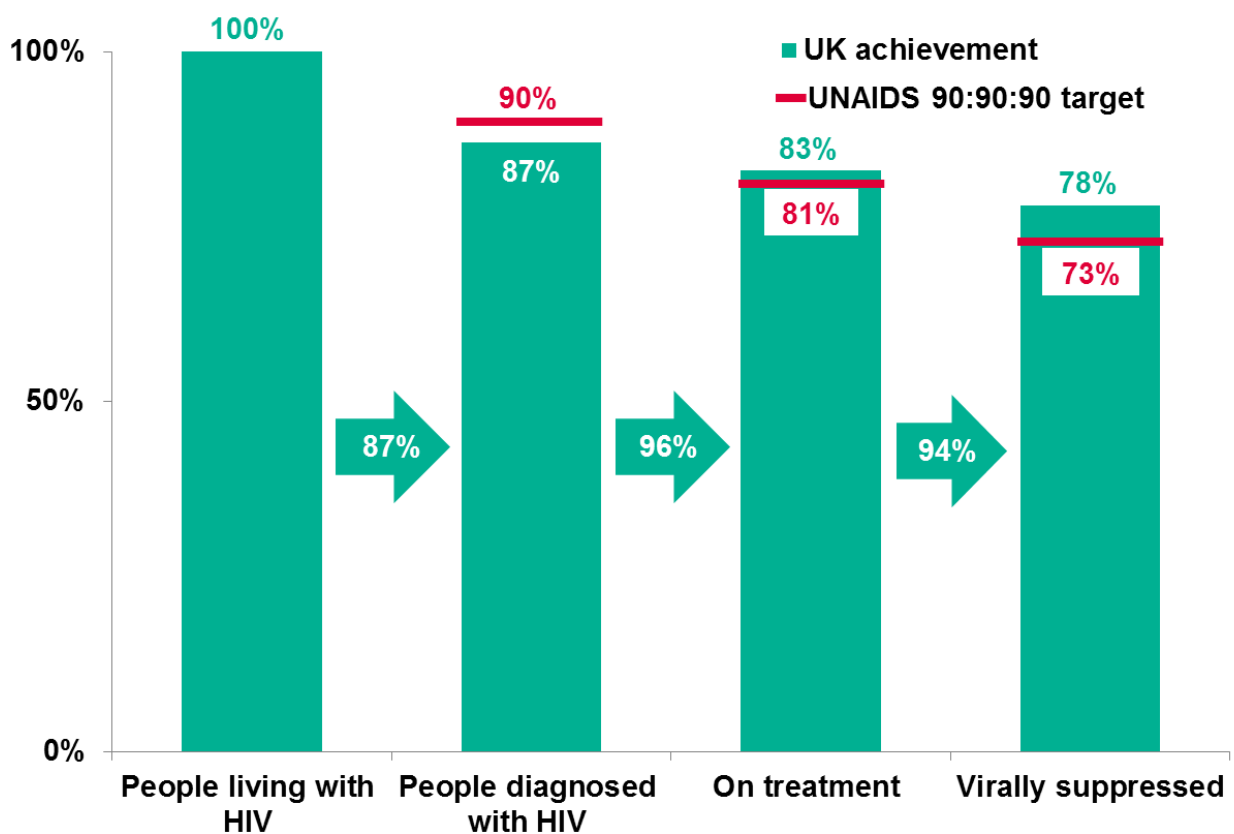




HIV in the UK 2016 report



UK HIV continuum of care: progress against UNAIDS target

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health, and are a distinct delivery organisation with operational autonomy to advise and support government, local authorities and the NHS in a professionally independent manner.

Public Health England

Wellington House

133-155 Waterloo Road

London SE1 8UG

Tel: 020 7654 8000

www.gov.uk/phe

Twitter: [@PHE_uk](https://twitter.com/PHE_uk)

Facebook: www.facebook.com/PublicHealthEngland

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Contributors: Adamma Aghaizu, Alex Bhattacharya, Francesco Brizzi, Glenn Codere, Stefano Conti, Nicholas Cooper, Sara Croxford, Daniela De Angelis, Sarika Desai, Chris Farey, Amrita Ghataure, Matthew Hibbert, Ford Hickson, Meaghan Kall, Carole Kelly, Jameel Khawam, Maeve Lalor, Mark McCall, Janice Morgan, Gary Murphy, Sandra Okala, Anne Presanis, Rajani Raghu, Andrew Skingsley, Lucy Thomas, Claire Thorne, Jennifer Tosswill, Anna Tostevin, Lesley Wallace, Joanne Winter, Zheng Yin
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Introduction

It is 20 years since the introduction of life-saving, free and effective antiretroviral therapy (ART) in the UK. Treatment has transformed HIV from a fatal infection into a chronic, manageable condition and people living with HIV in the UK can now expect to live into old age if diagnosed promptly. For many people, treatment means one daily tablet with no or few side effects. More recently, it has been demonstrated that the advantages of ART extend beyond personal clinical benefit. It is now widely understood that effective HIV treatment results in an ‘undetectable’ viral load which is protective from passing on the virus to others [1, 2].

While testing and treatment for HIV in the UK is free and available to all, over 13,000 people living with HIV remain undiagnosed and rates of late diagnosis remain high. Late HIV diagnosis is associated with poorer health outcomes, including premature death [3, 4]. Furthermore, since the vast majority of people diagnosed with HIV are effectively treated, most new HIV infections are passed on from persons unaware of their infection [5]. Condoms remain an important way to prevent HIV and other sexually transmitted infections (STIs) (and unintended pregnancy) and continue to be recommended, with new and casual partners in particular.

Symptoms due to HIV and AIDS may not appear for many years, and people who are unaware of their infection may not feel themselves to be at risk. However, anyone can acquire HIV regardless of age, gender, ethnicity, sexuality or religion and it is essential to challenge assumptions about who is at risk of HIV. As well as increasing awareness of HIV, efforts to reduce stigma and other socio-cultural barriers that prevent people from testing and seeking long-term care must be strengthened.

The good news is that it has never been easier to have an HIV test. Tests are free and anonymous and available at specialised sexual health services nationwide. In most cases the test involves a fingerprick and results are ready within minutes. General practitioners (GP’s) and many other healthcare and community settings also offer HIV tests. Alternatively, a blood sample can be taken at home and sent to a local laboratory (self-sampling – kits available online: www.freetesting.hiv) or the test can be performed at home (self-testing).

This report provides the latest data and estimates on the HIV epidemic in the UK and describes the quality of HIV care delivered through specialised services. For the first time, survey data that shows what it is like living with HIV is included, as well as personal quotes to contextualise the experiences of those living with HIV in the UK today.

This report complements an earlier statistical report on the HIV epidemic in the UK, as well as specific reports on HIV testing and on infections, including HIV, in people who inject drugs [6, 7]. Further information can be found on the Public Health England (PHE) web pages: www.gov.uk/government/collections/hiv-surveillance-data-and-management

Key findings and prevention implications

The number of people unaware of their HIV infection remains high

In 2015, an estimated 101,200 people (95% credible interval (CrI) 97,500-105,700) were living with HIV in the UK, of those, 13,500 (95% CrI 10,200-17,800), or 13% (95% CrI 10-17%) were unaware of their infection and at risk of passing on the virus to others. The majority, 69% (69,500; 95% CrI 66,300-73,700), were men and 31% (31,600; 95% CrI 30,600-32,800) were women¹. The HIV prevalence in the UK is estimated to be 1.6 per 1,000 population, or 0.16%.

HIV incidence among gay, bisexual and other men who have sex with men remains high

HIV incidence (the number of new infections) among gay, bisexual and other men who have sex with men, hereafter referred to as gay/bisexual men², remains consistently high; in England an estimated 2,800 (95% CrI 1,700-4,400) gay/bisexual men acquired HIV in 2015 with the vast majority acquiring the virus within the UK. Overall in 2015, 47,000 (95% CrI 44,200-50,900) gay/bisexual men were estimated to be living with HIV, of whom 5,800 (95% CrI 3,200-9,600), or 12% (95% CrI 7-19%) remained undiagnosed.

New diagnosis rates remain high, driven by ongoing transmission and sustained testing

In 2015, 6,095 people were diagnosed with HIV: this represents a new diagnosis rate of 11.4 per 100,000 people. This rate is higher than most other countries in western Europe, the average being 6.3 per 100,000 people in 2015 [9]. The number of people diagnosed each year in the UK has remained around 6,000 for the past five years, reflecting both testing efforts and ongoing transmission of the virus.

The epidemic is diverse

People living with diagnosed HIV in the UK represent a diverse group and assumptions about the characteristics of those living with HIV need to be challenged. Over half (52%; 3,180/6,095³) of all people diagnosed in 2015 were born in the UK, compared with 38% (2,820/7,439) of people diagnosed in 2006. This is largely due to fewer diagnoses among heterosexual men and women born abroad, particularly in sub-Saharan Africa; there were 1,110 diagnoses among black African heterosexuals in 2015, compared with 3,170 in 2006. In

¹ Figures presented in text are rounded and may not sum to total, unrounded figures are included in appendices.

² Gay/bisexual men were previously referred to as men who have sex with men (MSM). The large majority of men who have sex with men who are diagnosed with HIV identify as gay or bisexual [7].

³ Figures adjusted for missing country of birth information, adjusted and rounded figures are presented throughout.

contrast, the number of gay/bisexual men born abroad has risen; in 2015, two in five gay/bisexual men diagnosed with HIV were born abroad (compared with two in seven in 2006).

Timely diagnosis of HIV remains a major challenge

Fewer people are diagnosed with an AIDS-defining illness or at a late stage of infection (with a CD4 cell count less than 350 cells/mm³), but the numbers diagnosed late remain high. In 2015, among those with CD4 data available, 39% (1,920/4,969) of adults were diagnosed late, a decline from 56% (3,349/5,974) in 2006. Of concern, people diagnosed late continue to have a ten-fold increased risk of death in the first year of diagnosis compared with those diagnosed early. This underscores the need to strengthen the application of testing policies [7].

HIV care is comprehensive and of a high standard for all

In 2015, 88,769 people received HIV care in the UK, up 73% from a decade ago (51,449 in 2006). This reflects the longer life expectancy conferred by effective ART, as well as consistent numbers of people newly diagnosed. Nearly all (97%) of the 6,095 people diagnosed with HIV in 2015 were linked to specialist HIV care within three months of diagnosis, similar to previous years. Furthermore, the vast majority (94%) of people accessing HIV care in 2015 were receiving ART and as a result have undetectable virus in their blood and body fluids and are very unlikely to pass on their infection to others.

Early diagnosis of HIV infection means better treatment outcomes and reduced risk of passing on the virus to others

In 2015, almost 7,000 people started ART for the first time. This compares with an average of 5,500 each year between 2010 and 2014. This rise reflects revised guidelines from the British HIV Association (BHIVA) and World Health Organisation (WHO) [10, 11] which recommend that patients start ART at diagnosis regardless of CD4 count both for clinical benefits and preventing onward transmission. In 2015, two-thirds (66%) of people who started treatment had a CD4 cell count above 350 cells/mm³ and 41% above 500 cells/mm³. This compares with 22% and 10% respectively, a decade ago.

How to get an HIV test:

- go to an open-access STI clinic (some clinics offer 'fast-track' HIV testing) or a community testing site (www.aidsmap.com/hiv-test-finder)
- ask your GP for an HIV test
- request a self-sampling kit online (www.freetesting.hiv) or obtain a self-testing kit

Gay, bisexual and other men who have sex with men are advised to test for HIV and other STIs at least annually and every three months if having sex with new or casual partners.

Black African men and women are advised to have an HIV test and a regular HIV and STI screen if having condomless sex with new or casual partners.

Continuum of HIV care

“When I was first diagnosed in the mid-90s, life was very different. Treatment was awful with around 20 tablets a day at high strengths. Time has changed and so have treatments and there is really no reason that you should not live a normal life.”

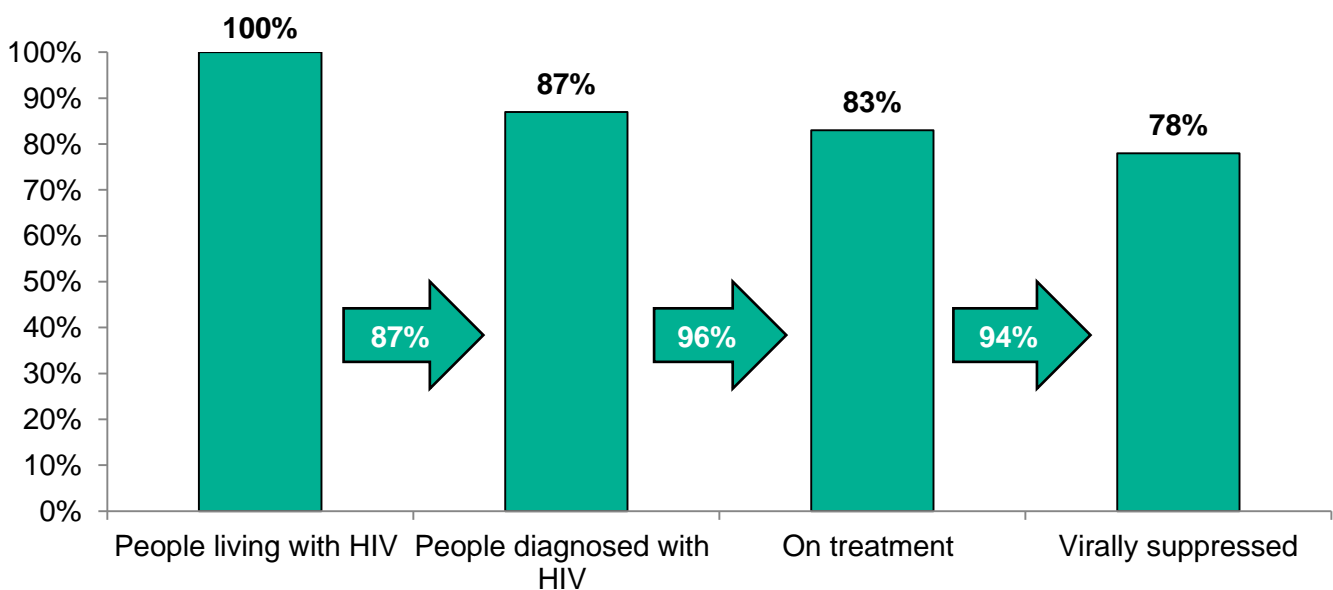
Gay man, aged 44, diagnosed in 1996

The continuum of HIV care illustrates key measures of HIV care and provides an opportunity to assess progress towards the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90:90:90 targets [12]. This target aims for 90% of people living with HIV to be diagnosed, 90% of those diagnosed to be receiving HIV treatment and 90% of those receiving treatment to have a suppressed viral load, by 2020. Overall, this equates to 73% of all people living with HIV having a suppressed viral load.

In the UK in 2015, 87% (CrI 83-90%) of the 101,200 (95% CrI 97,500-105,700) estimated number of people living with HIV were diagnosed. Of those diagnosed, 96% were receiving HIV treatment and of those receiving treatment, 94% had a suppressed viral load (Figure 1). While the UK is currently falling short of the first UNAIDS target for 90% of people living with HIV to be diagnosed, the second two metrics have been met and 78% of people living with HIV in the UK are estimated to have a suppressed viral load, surpassing the overall aim of the UNAIDS target (73%).

Despite advancements made towards the 90:90:90 treatment target, further efforts are required to curtail HIV transmission in the UK. Areas of concern include continuing high levels of transmission and high rates of late HIV diagnosis.

Figure 1: Continuum of HIV care: United Kingdom, 2015



Estimated number of people living with HIV

A number of statistical models have been developed to estimate the total number of people living with HIV in the UK.

A Bayesian multi-parameter evidence synthesis (MPES) model, revised each year to take into account changes in data sources, was used to estimate the number of people living with diagnosed and undiagnosed HIV in the UK. In 2016, estimates for heterosexuals were updated using different and additional data sources. To account for the discontinuation of the Unlinked Anonymous Dried Blood Spot (UA DBS) survey in pregnant women, estimates for pregnant women were based upon a combination of data from the National Survey of HIV in Pregnancy and Childhood and the number of live births occurring each year. As these data sets are much larger than the UA DBS survey, estimates are more precise. Additional data from the African Health and Sex Survey [14] were included to strengthen prevalence estimates among heterosexual men and women.

Based on this data it was estimated that 101,200 (95% CrI⁴ 97,500-105,700) people were living with HIV in the UK in 2015, of whom 69% (69,500; 95% CrI 66,300-73,700) were men and 31% (31,600; 95% CrI 30,600-32,800) were women⁵ (Figure 2). Two in five people (40,300; 95% CrI 38,500-43,600) were living in London.

Using these estimates, the overall prevalence of HIV in the UK in 2015 was 1.6 per 1,000 (95% CrI 1.5-1.6) among people of all ages and 2.1 per 1,000 (95% CrI 2.0-2.2) among people aged 15-74 years. HIV prevalence was higher among men, estimated at 2.3 per 1,000 (95% CrI 2.2-2.5) compared with women, estimated at 0.98 per 1,000 (95% CrI 0.95-1.02).

A total of 47,000 (95% CrI 44,200-50,900) gay/bisexual men were estimated to be living with HIV in 2015 (Appendix 1). Using the estimate that 3.3% of men in the UK are men who have had sex with other men in the past five years (880,000 out of all men in 2015) [13, 15], the prevalence of HIV in this population was one in 17, or 58.7 (95% CrI 51.2-68.0) per 1,000. HIV prevalence among gay/bisexual men was higher in London with one in seven, or 135 (95% CrI 101-184) per 1,000, estimated to be living with HIV, compared with one in 25, or 39.1 (95% CrI 33.4-46.5) per 1,000, in the rest of England and Wales.

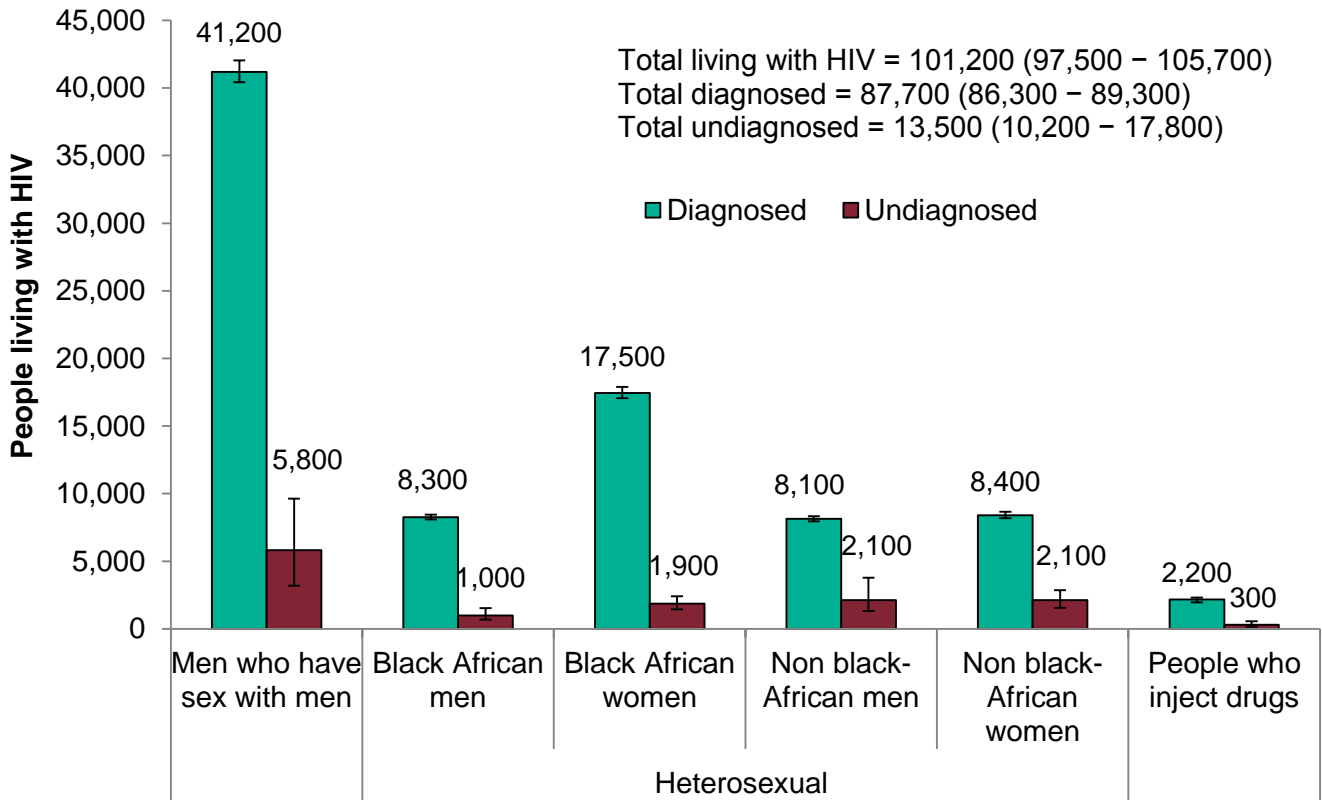
In 2015, 19,600 (95% CrI 18,600-21,500) heterosexual men and 29,900 (95% CrI 28,900-31,000) heterosexual women were estimated to be living with HIV, of whom 9,300 (95% CrI 8,900-9,800) were black African men and 19,300 (95% CrI 18,700-20,000) were black African

⁴ 95% credible intervals describe the statistical uncertainty surrounding estimates from a Bayesian analysis, which correctly and formally propagates the uncertainty inherent in the data through to the final estimates.

⁵ Figures presented in text are rounded and may not sum to total, unrounded figures are included in appendices.

women (Appendix 1). The estimated prevalence of HIV among all heterosexuals was low (1.0 (95% CrI 1.0-1.1) per 1,000), but greater among black African adults; 22.2 (95% CrI 21.3-23.6) per 1,000 among black African heterosexual men and 42.6 (95% CrI 41.0-44.3) per 1,000 among black African heterosexual women.

Figure 2: Estimated number of people living with HIV (both diagnosed and undiagnosed) using the MPES model, all ages: UK, 2015



Other methods can also be used to estimate the number of people living with HIV in the UK. A recent study, based on a HIV synthesis progression model [16], estimated that in 2013, 106,400 (90% plausibility range⁶ 88,700-124,600) people were living with HIV in the UK, the MPES estimates lie within this plausible range.

Number of people living with undiagnosed HIV

An estimated 13,500 (95% CrI 10,200-17,800) or 13% (95% CrI 10-17%) of people living with HIV were living with an undiagnosed infection in 2015 and at risk of passing on their infection if having unprotected sex.

⁶ Plausibility ranges are an approximate assessment of uncertainty associated with estimates.

In 2015, 12% (95% CrI 7-19%) of gay/bisexual men, 16% (95% CrI 12-23%) of heterosexual men and 13% (95% CrI 11-16%) of heterosexual women living with HIV were estimated to be unaware of their infection⁷. The proportion undiagnosed was higher amongst populations considered to be at lower risk of HIV; among non-black African heterosexual men and women, 21% (95% CrI 14-32%) and 20% (95% CrI 16-25%) were unaware of their infection, respectively. The proportion of black African heterosexual men and women unaware of their infection was 11% (95% CrI 8-16%) and 10% (95% CrI 16-25%), respectively.

Over 95% of all people living with HIV in the UK most likely acquired their infection through sexual contact, around half of whom were heterosexuals and half were gay/bisexual men. Although less common as a route of HIV exposure, HIV transmission continues among people who inject drugs (PWID) and the emergence of injecting drug use as part of/during sex (referred to as slamming/slamsex) among gay/bisexual men is of concern [8].

In 2015, an estimated 2,500 (95% CrI 2,200-2,800) people who inject drugs (PWID) were living with HIV in the UK, of whom 315 (95% CrI 156-568) or 13% (95% CrI 7-21%) were estimated to be living with an undiagnosed infection. HIV prevalence among PWID aged 15-74 was estimated to be 3.8 (95% CrI 2.6-5.3) per 1,000.

Among people living with HIV in London, 11% (95% CrI 7-18%) were estimated to be unaware of their HIV infection, this compares with 13% (95% CrI 10-17%) in those living in England and Wales, outside of London⁷. An estimated one third (4,400; 95% CrI 2,800-7,800) of all people living with undiagnosed HIV in the UK were living in London (Appendix 2).

A similar proportion of gay/bisexual men within London (10%; 95% CrI 4-23%) were unaware of their infection as those outside of London (11%; 4-19%) and very similar proportions were estimated for black African heterosexuals (Appendix 2). Geographical differences in undiagnosed HIV were observed among non-black African men and women, with the proportion of undiagnosed infection within London (14% (95% CrI 7-28%) and 16% (95% CrI 10-24%) respectively) being lower than the proportion outside of London (23% (95% CrI 14-37%) and 21% (95% CrI 16-29%) respectively).

In comparison with estimates above, made using the MPES model, a recent study using a HIV synthesis progression model estimated that 24,600 (90% plausibility range 15,000-36,200) people with HIV were living with an undiagnosed infection in 2013 [16]. Again, this range overlaps the credible intervals of the MPES model estimates. The model estimated that 19% (90% plausibility range 9-28%) of gay/bisexual men were unaware of their infection in 2013 and 26% (90% plausibility range 22-26%) and 20% (90% plausibility range 17-34%) of black African men and women heterosexuals, respectively.

⁷ Numbers of undiagnosed are included in appendices.

Estimates of HIV incidence

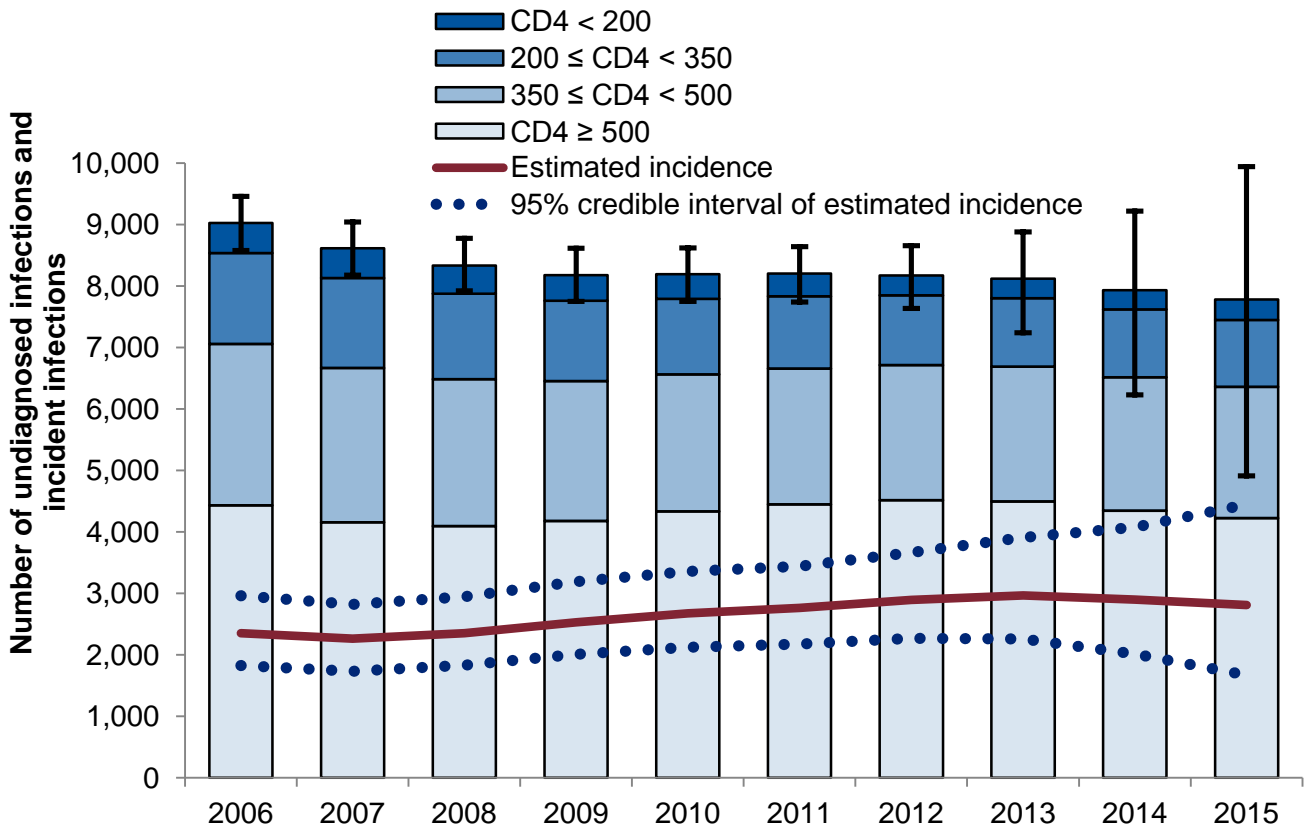
“Being diagnosed recently came as a shock, if not a total surprise. As a gay man in middle age, I’ve grown up with the AIDS epidemic and like most gay men I’ve been under its cloud. I’ve reached out to HIV support organisations to better manage my own self-care and through this have met others who are living well with the virus. I’m now able to live life to the full, much as before.”

White gay man, aged 47

A CD4 back-calculation model was used to estimate HIV incidence among gay/bisexual men living in England and also provides an estimate on undiagnosed prevalence in this group [17]. This method is not currently used for other populations, due to the complexity of incorporating the effects of migration.

In 2015, a total of 2,800 gay/bisexual men (95% credible interval 1,700-4,400) were estimated to have acquired a new HIV infection in England (Figure 3). This is in line with the previous five years where an estimated 2,800 men on average acquired HIV each year between 2010 and 2014.

Figure 3: Back-calculation estimates of HIV incidence and number of prevalent undiagnosed HIV infections (including 95% credible interval) by CD4 strata, among gay/bisexual men aged 15 years and over: England, 2006-2015



Based on results of the CD4 back-calculation model, a total of 7,800 gay/bisexual men (95% CrI 6,000-10,200) were estimated to be living with an undiagnosed HIV infection in England in 2015; a number which has remained stable over the decade. The estimated distribution of CD4 strata among those living with an undiagnosed infection has varied little over the past ten years with around half of those living with an undiagnosed infection having a CD4 count above 500 cells/mm³ (Figure 3). It is likely that these men acquired their infection within the past one to three years [18].

The estimate for the number of gay/bisexual men living with an undiagnosed HIV infection through the CD4 back-calculation lies in the upper bound of the estimate produced by the MPES model 4,700 (95% CrI 2,300-8,400) in England and Wales in 2015. As these methodologies use different data sources, it is likely that the true number of gay/bisexual men living with undiagnosed HIV lies between the two.

Estimates of HIV incidence were also made in a recent study using a HIV synthesis progression model [16], where 2,500 (90% plausibility range 900-5,800) new HIV infections were estimated to have been acquired annually among gay/bisexual men between 2010 and 2013, similar to estimates produced through the CD4 back-calculation model. The synthesis progression model is able to produce annual estimates for the entire population and estimated 4,700 (90% plausibility range 2,000-9,800) new HIV infections annually with 1,200 (90% plausibility range 800-2,300) among black African heterosexuals between 2010-2013.

Persons diagnosed with HIV in 2015

“Just a few words from someone who has been living with HIV for nearly 20 years: it’s not that bad and there are times when you forget you have HIV. Eventually, even when you remember you’re positive, it’s no longer an issue.”

White woman, aged 44

In 2015, 6,095 people were newly diagnosed with HIV, (4,551 men and 1,537 women⁸). Although a slight decrease on the 6,172 diagnoses recorded in 2014, the annual number of new HIV diagnoses remains high and represents an annual HIV diagnosis rate of 11.3 per 100,000 people aged 15 years and over (17.3 per 100,000 men and 5.5 per 100,000 women). The number of new HIV diagnoses has declined from 7,439 in 2006, largely due to a decrease in diagnoses reported among heterosexuals born abroad. In 2015, the UK had one of the highest rates of new HIV diagnosis in western Europe, where the average rate is 6.3 per 100,000 people [9]. High rates of new HIV diagnosis in the UK are due to both ongoing transmission and high testing rates in STI clinics.

London accounted for almost half (43%; 2,603/6,095) of new HIV diagnoses in the UK in 2015, with the Midlands and East of England PHE region contributing the largest number of new diagnoses outside of London (19%; 1,181/6,095).

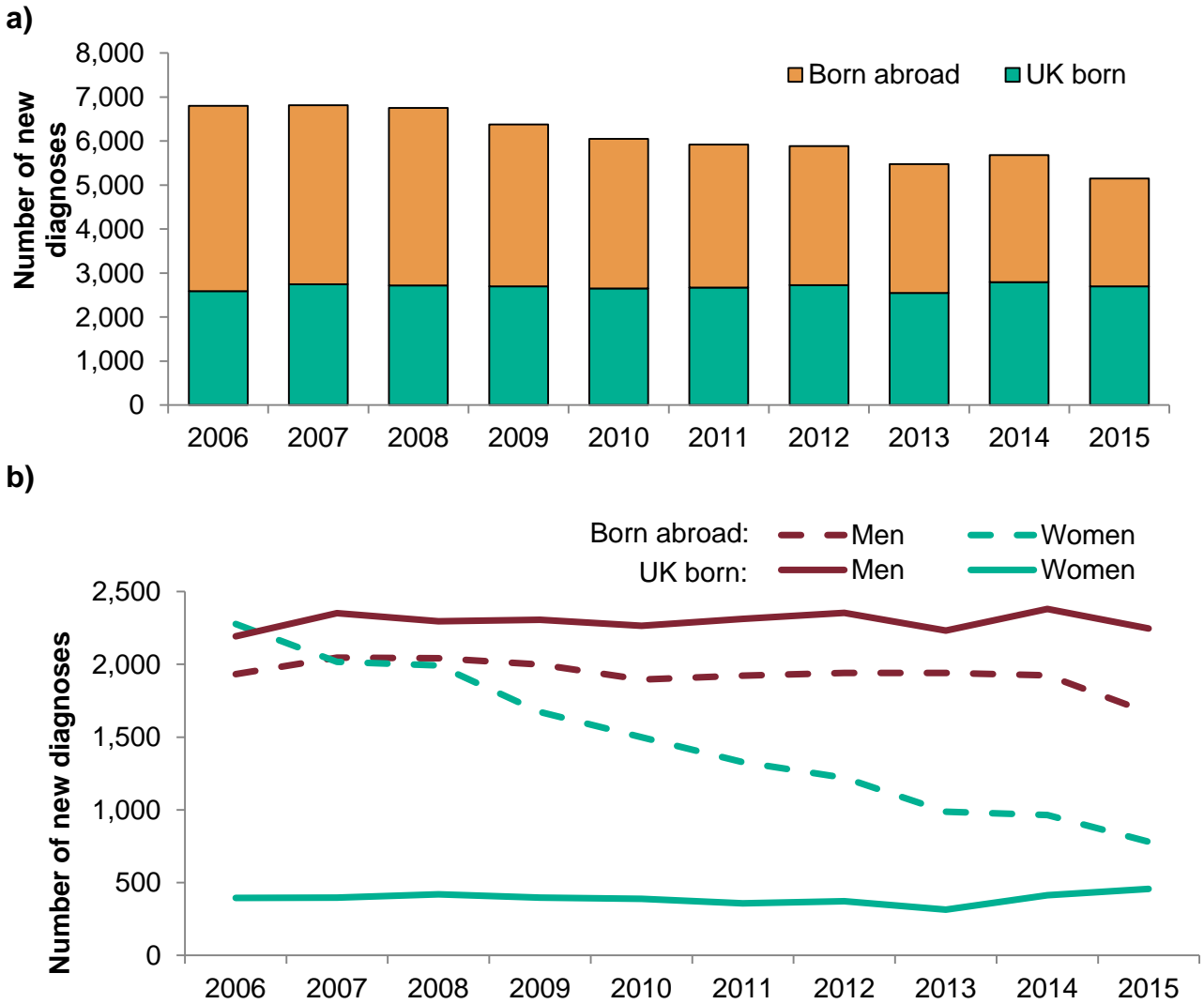
Most people (71%; 4,324/6,095) diagnosed were aged between 25 and 49 years. However, the proportion diagnosed at age 50 years and over has increased from 9% (667/7,439) in 2006 to 17% (1,018/6,095) in 2015.

In 2015, for the first time since the 1990s, the proportion of people diagnosed with HIV who were born in the UK (52%; 3,160/6,095⁹) exceeded the proportion born abroad (48%; 2,900/6,095) (Figure 4a). The shift is largely due to a steep decline in the number of new diagnoses among heterosexuals, (particularly women) born abroad (Figure 4b).

⁸ Gender was not reported for seven individuals.

⁹ Figures adjusted for missing country of birth information, adjusted and rounded data are presented throughout.

Figure 4: New HIV diagnoses by place of birth and gender: UK, 2006-2015



Gay/bisexual men

“After the initial shock HIV became very much a background aspect of my life. Both myself and my partner continue to live our lives as if we were unaffected by HIV.”

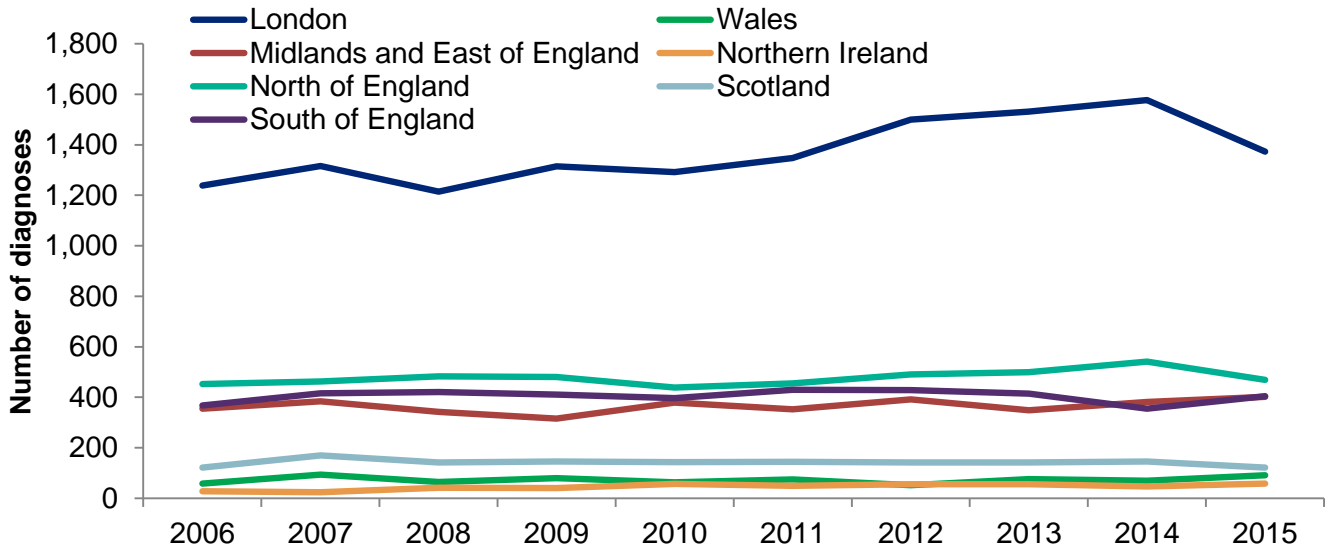
White gay man, diagnosed 2004

The number of new HIV diagnoses reported among gay/bisexual men steadily increased from 2,670 in 2006 to 3,360 in 2014 and has remained high in 2015 at 3,320. The sustained high level of new diagnoses among gay/bisexual men is explained by the combination of an increase in the levels of HIV testing, as well as ongoing high rates of transmission.

London had the highest number of new HIV diagnoses among gay/bisexual men in 2015 (1,373), followed by the PHE regions of the North of England (469), the South of England (404) and the Midlands and East of England (402). There were 122, 91 and 58 diagnoses among

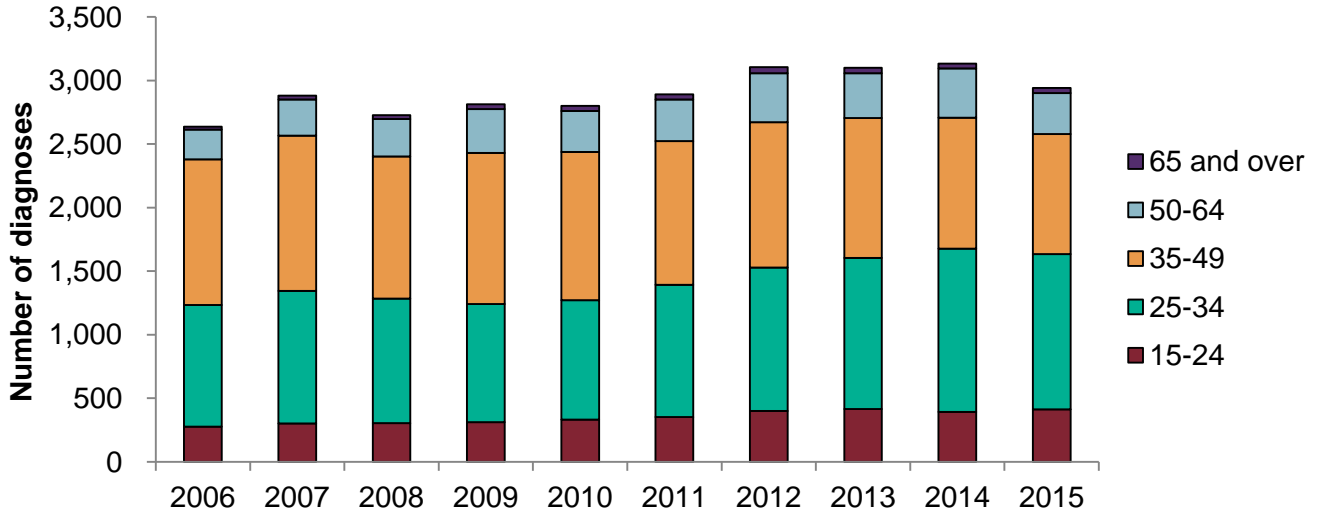
gay/bisexual men in Scotland, Wales and Northern Ireland, respectively. Diagnoses made in London have accounted for much of the rise in the numbers of gay/bisexual men with HIV over the past decade, with the number of diagnoses remaining constant across other PHE regions (Figure 5).

Figure 5: Geographical trends of new HIV diagnosis among gay/bisexual men: UK, 2006-2015



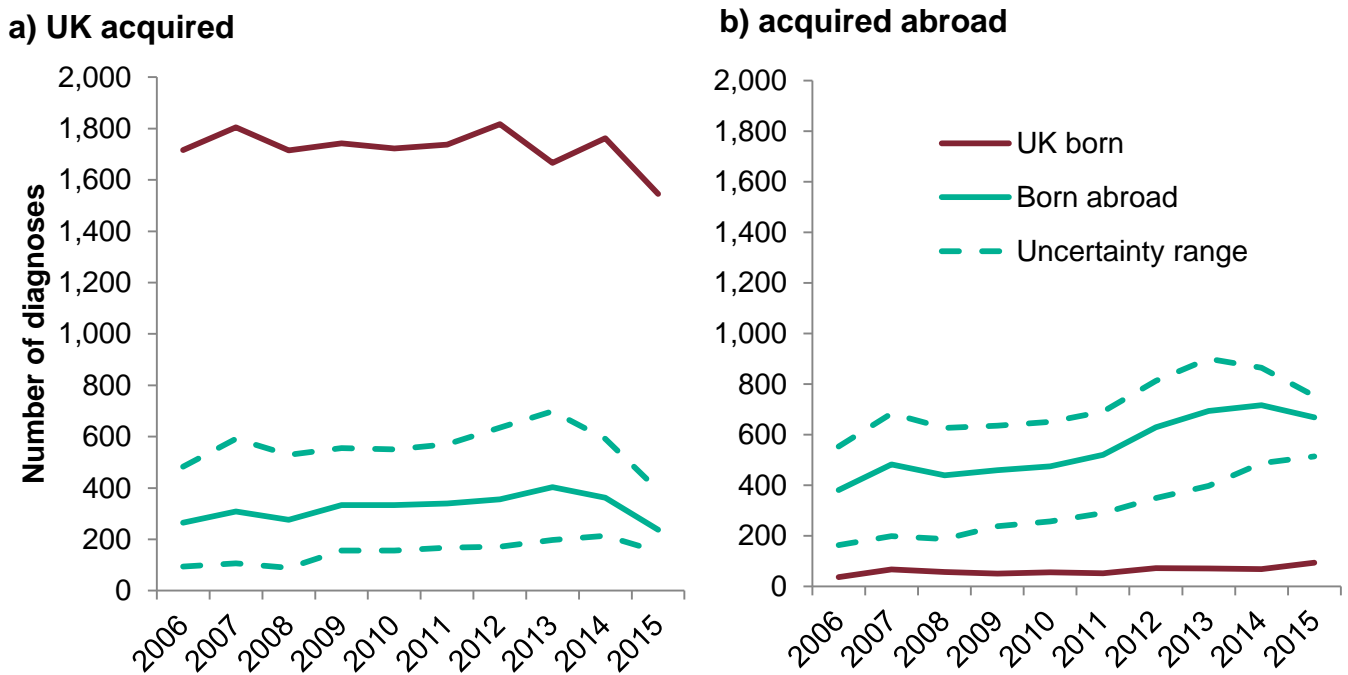
The median age at diagnosis for gay/bisexual men was 33 years (inter-quartile range (IQR) 32-33) in 2015, this compares with 35 (IQR 35-36) in 2006. This change is reflected in the increasing proportion of men aged under 35 years at the time of diagnosis, from 47% (1,238/2,627) in 2006 to 56% (1,644/2,923) in 2015 (Figure 6). Despite declining numbers of diagnoses in the 35-49 age group, a rise was also observed among gay/bisexual men in the upper age groups; one in nine (329/2,923) gay/bisexual men were aged 50 years or over at diagnosis in 2015, compared with one in 11 (233/2,627) in 2006.

Figure 6: Distribution of HIV diagnoses among gay/bisexual men by age group at diagnosis: UK, 2006-2015



By assigning probable country of infection based upon information on CD4 decline¹⁰, the number of gay/bisexual men estimated to have acquired their infection in the UK has remained stable at around 2,000 per year for the past decade, with no difference in trend between those born in the UK and those born abroad (Figure 7a). In contrast, the number of gay/bisexual men estimated to have acquired their infection abroad has risen from 419 (uncertainty range 201-590¹¹) in 2006 to 762 (uncertainty range 608-847) in 2015, with the rise driven by increasing numbers of diagnoses among gay/bisexual men born abroad (Figure 7b).

Figure 7: New HIV diagnoses among gay/bisexual men by region of birth and probable country of acquisition¹: UK, 2006-2015



¹Figures adjusted for missing exposure category and region of birth.

Heterosexual men and women

“The day I was giving a positive HIV diagnosis I thought all my life will be ruled by it, but today I see HIV as a tiny virus I control.”

African women, aged 36

In 2015, 1,350 women and 1,010 men who probably acquired HIV through heterosexual contact were diagnosed. The number of new diagnoses among heterosexuals has declined by almost half over the past decade, from 4,340 (58%) in 2006 to 2,360 (39%) in 2015,

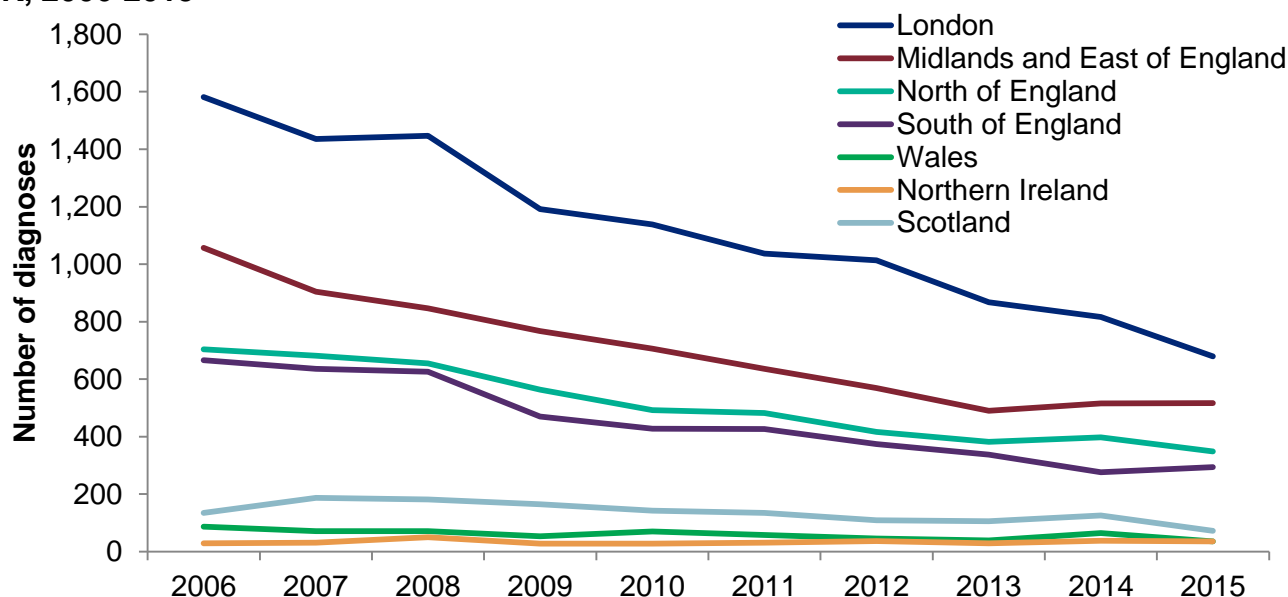
¹⁰ Probable country of infection is assigned based upon information on CD4 decline for those born abroad, as in [18]. Clinician-reported probable country of infection is used for those born in the UK.

¹¹ Uncertainty ranges are calculated using interquartile range, with an adjustment for those with missing region of birth information.

predominantly due to fewer reports among African-born men and women, which reflects changing migration patterns. This decline was particularly steep in England overall (from 4,009 to 1,837) and London (from 1,582 to 679) (Figure 8).

In 2015, the number of diagnoses among heterosexuals was highest in London (679), followed by the Midlands and East of England (516), North of England (348) and South of England (294). In Wales, Northern Ireland and Scotland the number of new diagnoses among heterosexuals was lower, with 35, 35, and 72 respectively.

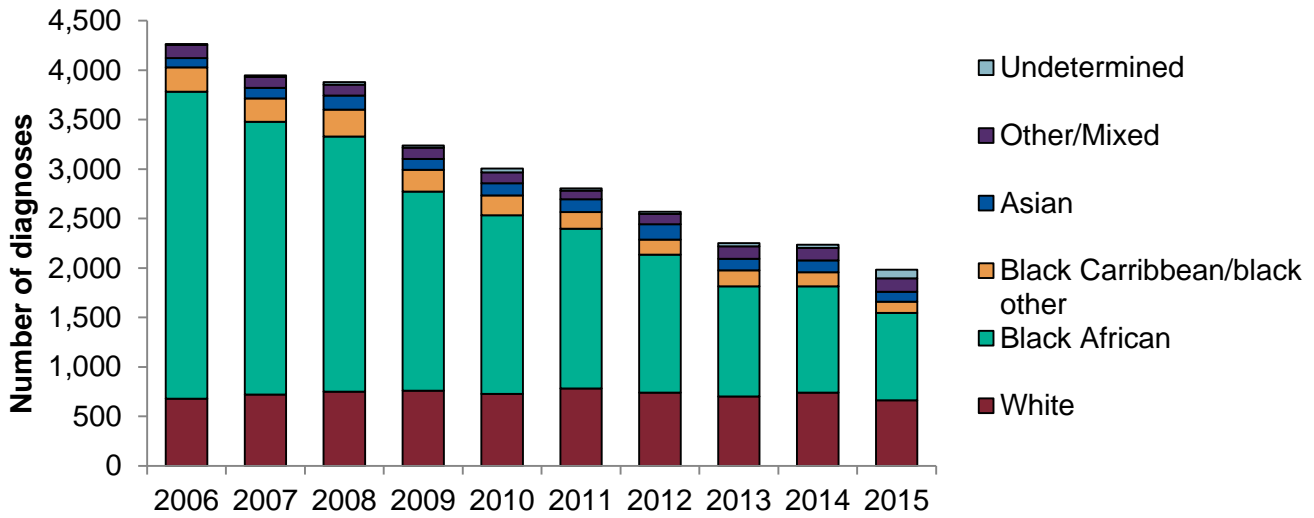
Figure 8: Geographical trends of new HIV diagnosis among heterosexuals: UK, 2006-2015



The median age at diagnosis in 2015 was 42 among heterosexual men and 39 among heterosexual women (compared with 33 among gay/bisexual men). More than a quarter (28%) of heterosexual men were aged 50 years or over at the time of their diagnosis, compared with 18% of heterosexual women. This compares to 13% and 7% in 2006 respectively.

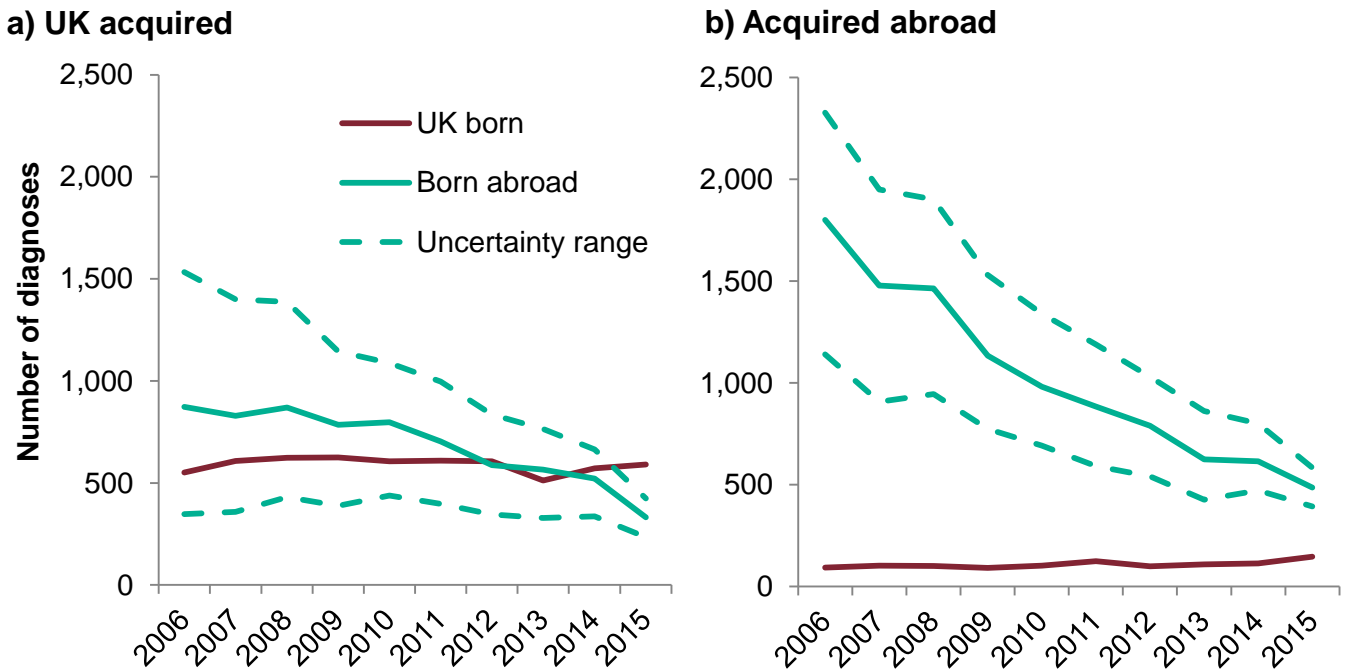
In 2015, black African men and women constituted 47% (1,110/2,360) of new HIV diagnoses among heterosexuals, after adjusting for missing information (Figure 9). This decrease, from 73% (3,170/4,340) in 2006, is likely due to changing migration patterns. In 2015, one in three (35%; 820/2,360) heterosexuals diagnosed was of white ethnicity, compared to one in six in 2006 (16%; 690/4,340). However, the overall number of diagnoses in this group has remained stable over the past decade. Six per cent (140) of diagnoses among heterosexuals were made among black Caribbean/black other men and women in 2015. Equivalent figures were 5% (120) and 7% (170) among heterosexuals of Asian and other/mixed ethnicity respectively.

Figure 9: New HIV diagnoses among heterosexuals by ethnicity: UK, 2006-2015



By assigning probable country of infection based upon information on CD4 decline, as for gay/bisexual men, the number of heterosexuals estimated to have acquired HIV within the UK has declined from 1,425 (uncertainty range 898-2,084) in 2006 to 922 (uncertainty range 825-1,016) in 2015, with the decline observed among those born abroad (Figure 10a). The number of heterosexuals estimated to have acquired HIV abroad has seen a much steeper decline from 1,893 (uncertainty range 1,234-2,420) in 2006 to 633 (uncertainty range 539-730) in 2015. Again, this decline has been driven by falling numbers of diagnoses in those born abroad (Figure 10b). Despite this, these figures highlight the continuing need for effective prevention strategies among migrant communities within the UK.

Figure 10: New HIV diagnoses among heterosexuals by region of birth and probable country of acquisition¹: UK, 2006-2015



¹Figures adjusted for missing exposure category and region of birth.

People who inject drugs

People who inject drugs (PWID) accounted for 3% (210) of new HIV diagnoses in 2015, a notable increase on the number diagnosed in recent years (160 in 2014). The increase is associated with an HIV outbreak among PWID living in Glasgow in 2015, which led to the diagnosis of over 50 people. Overall, the number of persons newly acquiring HIV through injecting drug use in the UK remains low. Over half (56%; 117/210) of diagnoses in PWID were among those born in the UK, 83 were men and 34 were women.

The 'Shooting Up' report, published by PHE, on infections among people who inject drugs includes further details of HIV acquisition and transmission in this group [6].

Mother to child transmission

“I came to the UK in 2004 hoping I could have a better life but all that changed when, a few months after arriving here, I was diagnosed with HIV. After a few years I entered a relationship and we decided to have children. My HIV consultant assured me that it was fine since my viral load was undetectable. I had my twins through C-section which was planned.”

African woman, aged 41

In 2015, 130 diagnoses were made among those who acquired their infection through mother to child transmission¹² – all except one were born outside of the UK.

Of the 860 children born to mothers living with HIV in the UK during 2015, one child acquired HIV through mother to child transmission; in this instance the mother presented for antenatal care late. A further 517 children were reported to have an “indeterminate” HIV status but are very unlikely to have acquired HIV. This is because almost all were born to women who were already aware of their HIV status and receiving effective ART. The remaining 342 children were reported to be uninfected. The risk of mother to child transmission of HIV in the UK is extremely low (below 0.5% between 2013 and 2015).

Recent infections

People diagnosed promptly are less likely to experience morbidity associated with HIV, are likely to respond better to treatment and to achieve a suppressed viral load more swiftly [19], highlighting the importance of prompt diagnosis.

¹² This figure is greater than the 65 diagnoses reported among children as it contains individuals diagnosed abroad as children who have arrived in the UK as adults.

In 2015, 46% of newly diagnosed individuals were tested for recent infection using the recent infection testing algorithm (RITA) [20]. Overall, 19% of those tested were likely to have acquired their infection within the four months preceding their HIV diagnosis¹³, this compares with 23% in 2014. The proportion diagnosed at a recent stage of infection was higher among gay/bisexual men (27%) than among heterosexual men (10%) and women (8%) (Appendix 4).

¹³ Data prior to 2014 used the cut-off of six months to define recent infection.

Late HIV diagnoses, AIDS and deaths

“I was diagnosed in 1991. Some people with HIV in the UK continue to be diagnosed late, which often means that they are desperately unwell before they go on treatment – like in the 90s when I was diagnosed and before we had the very effective treatment we have now. Testing early means that you can start treatment earlier and not get to the point where you are sick.”

Heterosexual woman, aged 57

Late HIV diagnoses

Late diagnosis is the most important predictor of morbidity and premature mortality among people with HIV infection [3, 4]. For surveillance purposes, a late HIV diagnosis is defined as having a CD4 cell count <350 cells/mm³ within three months of HIV diagnosis. People diagnosed late are likely to have been living with an undiagnosed HIV infection for at least three years and may have been at risk of passing on their infection to partners.

In 2015, 39% (1,920/4,969) of adults were diagnosed with HIV infection at a late stage of infection (CD4 <350 cells/mm³) and 21% (1,030/4,969) were severely immunocompromised at the time of their diagnosis, with a CD4 count <200 cells/mm³.

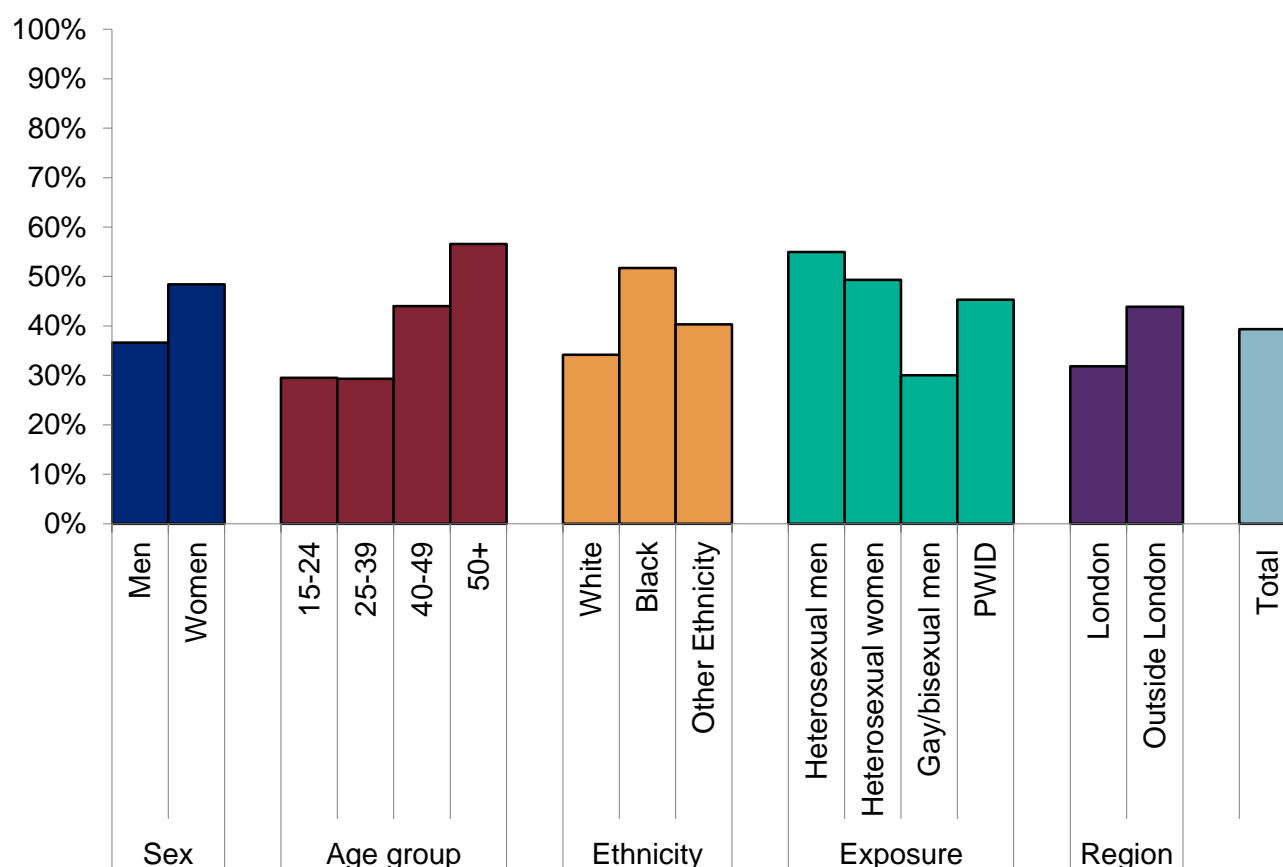
The proportion diagnosed late was highest among heterosexual men (54%; 419/769) and women (48%; 441/922) (Figure 11) and particularly high among those of black African ethnicity (men (59%; 160/272) and women (51%; 249/485)). The lowest proportion of late diagnosis was among gay/bisexual men, with 30% (777/2,628) diagnosed late. Overall, 45% (62/139) of persons who acquired HIV through injecting drug use were diagnosed late.

Rates of late diagnosis varied regionally, with the highest rate seen in the North of England (47%), followed by the Midlands and East of England (46%), South of England (41%) and London (32%). In Scotland, Wales and Northern Ireland, 31%, 51% and 29% of people were diagnosed late, respectively.

The proportion of people diagnosed late has declined from 56% (3,349/5,974) in 2006 to 39% (1,920/4,969) in 2015 and across all exposure groups. The decline was steepest among heterosexual women (from 64% to 48%), due in part to the antenatal screening programme, as well as changing migration patterns.

Rates of late HIV diagnosis is a key indicator in PHE's Public Health Outcomes Framework (PHOF), accessible from the following webpage: www.phoutcomes.info.

Figure 11: Proportion of adults diagnosed with a CD4 cell count <350 cells/mm³ by demographic: UK, 2015



AIDS and deaths among people with HIV

The number of AIDS diagnoses and deaths has steadily declined over the past decade. In 2015, 305 people were diagnosed with an AIDS-defining illness at, or within three months of, their HIV diagnosis, less than half the number diagnosed with AIDS at diagnosis in 2006 (714).

The most commonly diagnosed AIDS-defining illness was Pneumocystis pneumonia, accounting for 43% (132/305) of AIDS diagnoses in 2015, followed by oesophageal candidiasis (11%; 33/305) and *Mycobacterium tuberculosis* (9%; 27/305).

In 2015, 594 people with HIV infection died and over half of deaths (58%; 347/594) were among people aged 50 years and over.

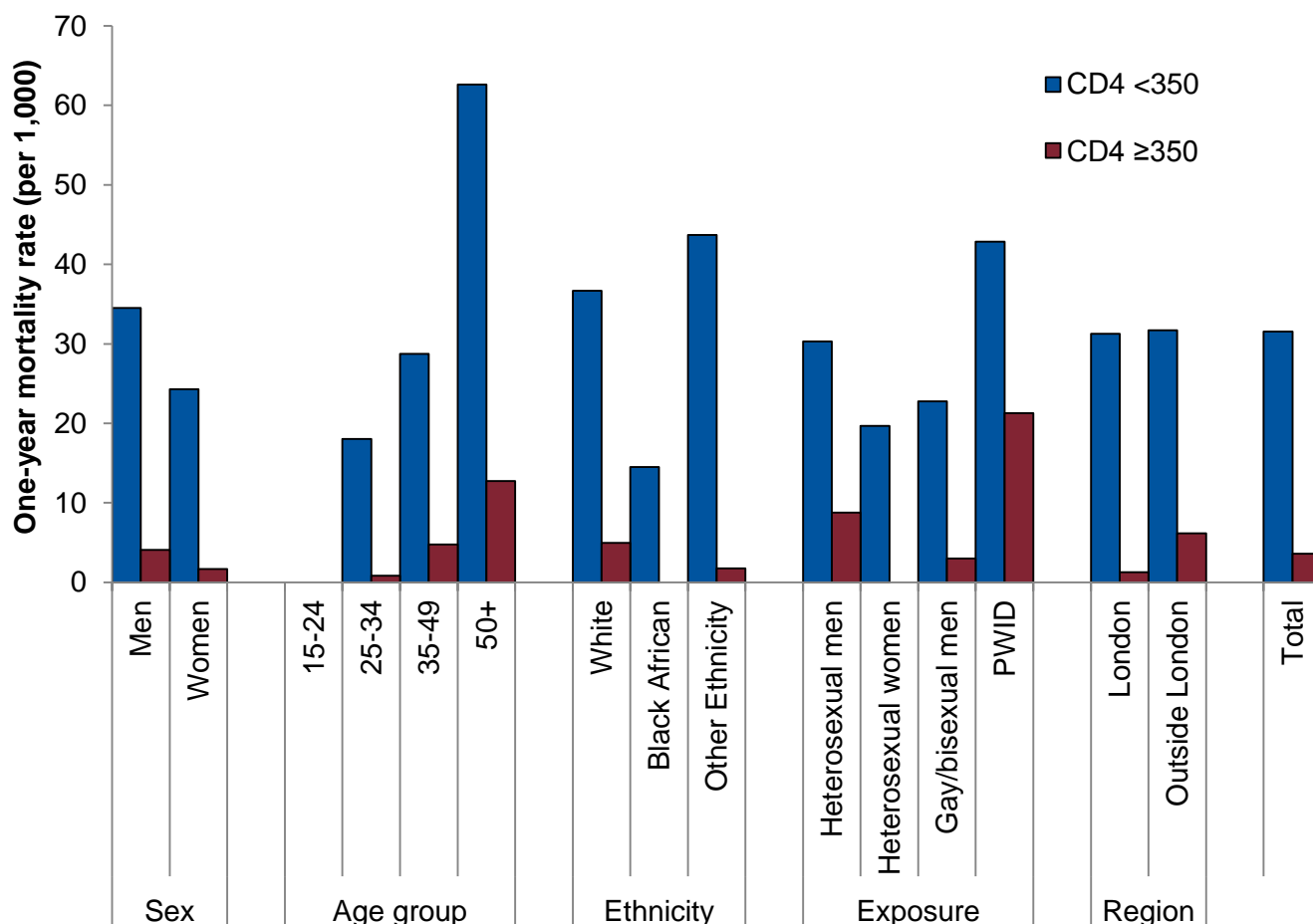
All-cause mortality among people living with HIV aged 15-59 years has declined from 10.2 per 1,000 in 2006 to 5.7 per 1,000 in 2015. This compares with a mortality rate of 1.6 per 1,000 aged 15-59 for the general population in 2015 [21]. Mortality rates were higher among men (6.4

per 1,000) compared with women (4.3 per 1,000). In the general population, this was 1.9 per 1,000 and 1.2 per 1,000, respectively [21].

In 2015, mortality rates were similar among gay/bisexual men and heterosexuals with diagnosed HIV, at 4.8 per 1,000 and 4.3 per 1,000, respectively. People diagnosed with HIV who injected drugs had the highest rate of death, with 25.0 per 1,000.

People diagnosed late are at increased risk of developing an AIDS-defining illness and continue to have a ten-fold increased risk of death in the year following their diagnosis, as compared with those diagnosed promptly (31.5 per 1,000 compared to 3.6 per 1,000) (Figure 12). One-year mortality was particularly marked among people aged 50 years and over, where one in 16 diagnosed late died within a year of diagnosis.

Figure 12: One-year mortality among adults newly diagnosed with HIV by CD4 count at diagnosis: UK, 2014



HIV and tuberculosis

In 2014, 205 adults living with HIV were diagnosed with tuberculosis (TB) in England, Wales and Northern Ireland. This rate is substantially higher than in the general population (12 per 100,000¹⁴). TB incidence was highest among people living with HIV who were born in a country with high prevalence of both infections [22].

People living with HIV are at increased risk of co-infections related to immunodeficiency. *Mycobacterium tuberculosis* (MTB) remains one of the most common AIDS-defining illnesses in the UK and HIV testing should be one of the routine tests offered to TB patients. Indeed, BHIVA recommends testing for latent TB infection (LTBI) for people living with HIV with a low CD4 cell count, or if they come from a sub-Saharan country where HIV and TB co-infection is more common [23].

Transmitted HIV drug resistance

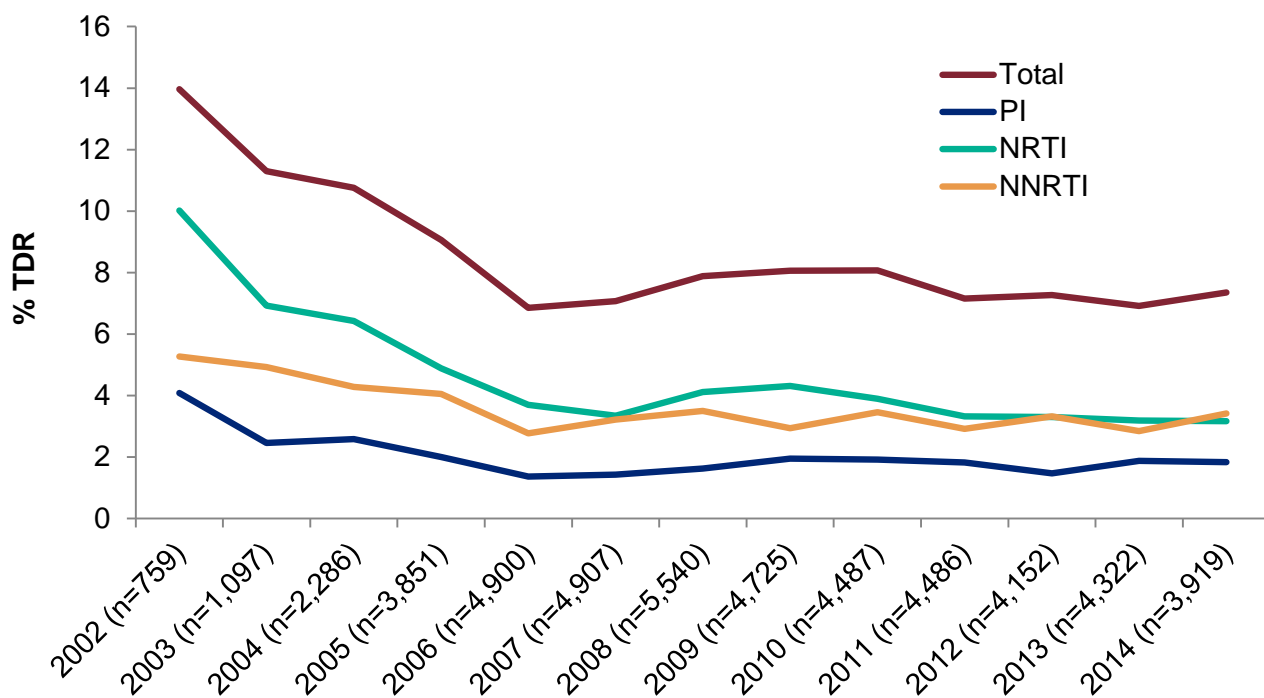
Testing the HIV virus for drug resistance at the time of HIV diagnosis is routinely conducted in the UK. Between 2011 and 2014, the prevalence of transmitted drug resistance (TDR) (defined as the presence of one or more mutations of the HIV virus from the WHO 2009 Surveillance list [24]) remained stable and an average of 7.2% of persons tested had detectable drug resistance. Transmitted resistance to the different drug classes remained low and stable with 1.8% of people tested having mutations affecting the protease inhibitor (PI) drug class, 3.2% with mutations affecting the nucleoside reverse transcriptase inhibitor (NRTI) drug class and 3.1% with mutations affecting the nonnucleoside reverse transcriptase inhibitor (NNRTI) drug class (Figure 13a). Clinically relevant resistance to currently recommended first line drugs also remains low – below 10% in 2010-2013 [25].

In 2014, the prevalence of TDR among gay/bisexual men was very similar to that of heterosexual men and women. However, prevalence has declined among gay/bisexual men in recent years while remaining stable or increasing among heterosexuals (Figure 13b).

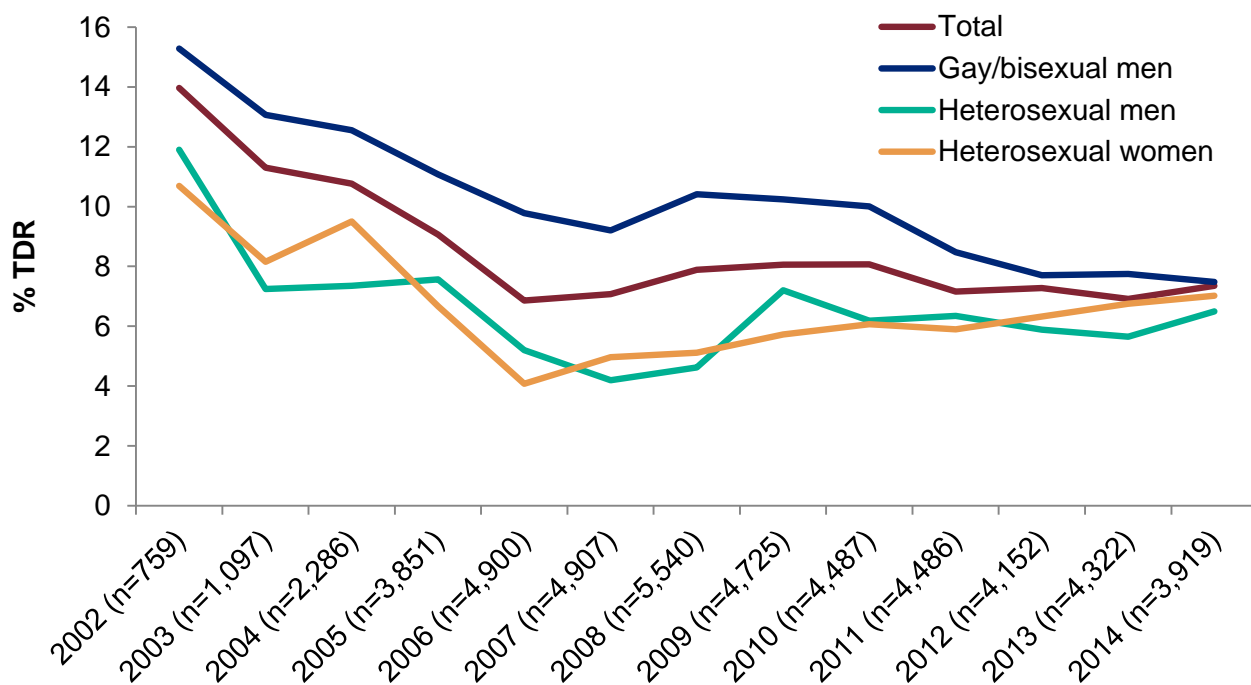
¹⁴ Denominator includes all people living with HIV (both diagnosed and undiagnosed).

Figure 13: Transmitted drug resistance among adults newly diagnosed with HIV: UK, 2002-2014

a) By drug class



b) By exposure group



People seen for HIV care

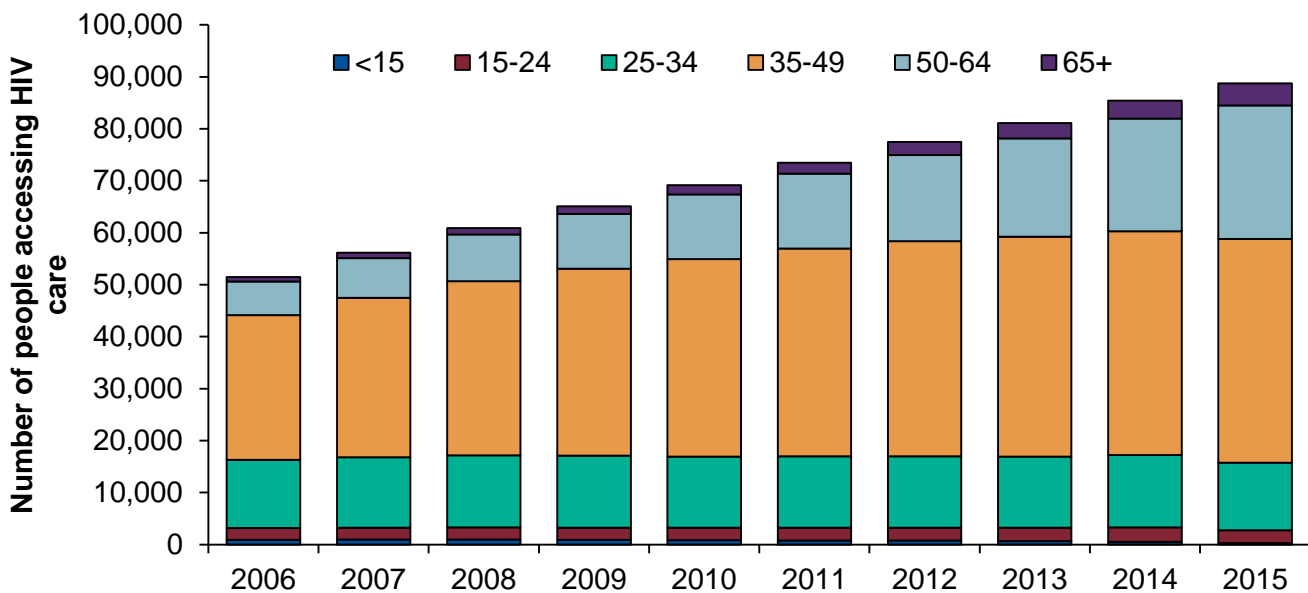
“I was diagnosed late with HIV and admitted to hospital. Key to my recovery has been HIV care coordinated and delivered with empathy and understanding.”

Asian woman, aged 46

HIV care in the UK is of a very high standard and available free of charge across the UK at specialist HIV services. In 2015, 88,769 people (61,097 men and 27,672 women) living with diagnosed HIV infection received HIV care in the UK. This is a 4% increase on the number seen for care in 2014 (85,396) and a 73% increase on the number a decade before (51,449 in 2006).

This rise is due to a combination of ongoing transmission and improvements in therapies which have increased the lifespan of people living with HIV. In 2015, one in three (34%; 29,960/88,769) people accessing HIV specialist care was aged 50 years and above, this compares with one in seven in 2006 (14%; 7,320/51,449). The median age of people accessing care has increased, from 39 in 2006 to 45 in 2015 over the past decade (Figure 14).

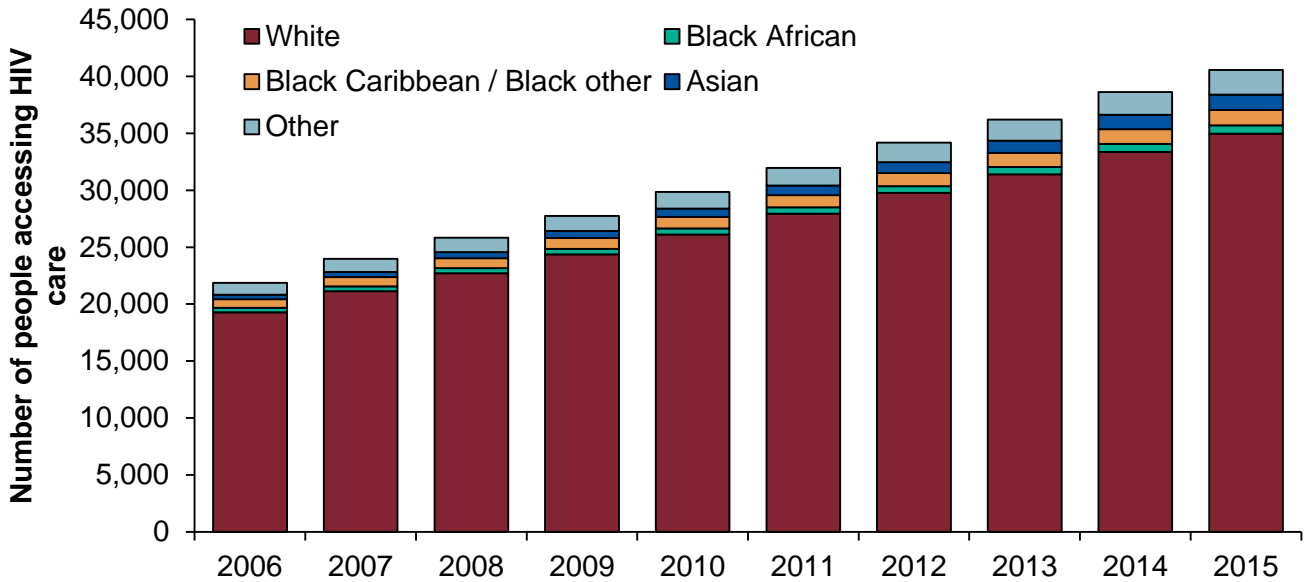
Figure 14: People diagnosed with HIV accessing HIV specialist care, by age group: UK, 2006-2015



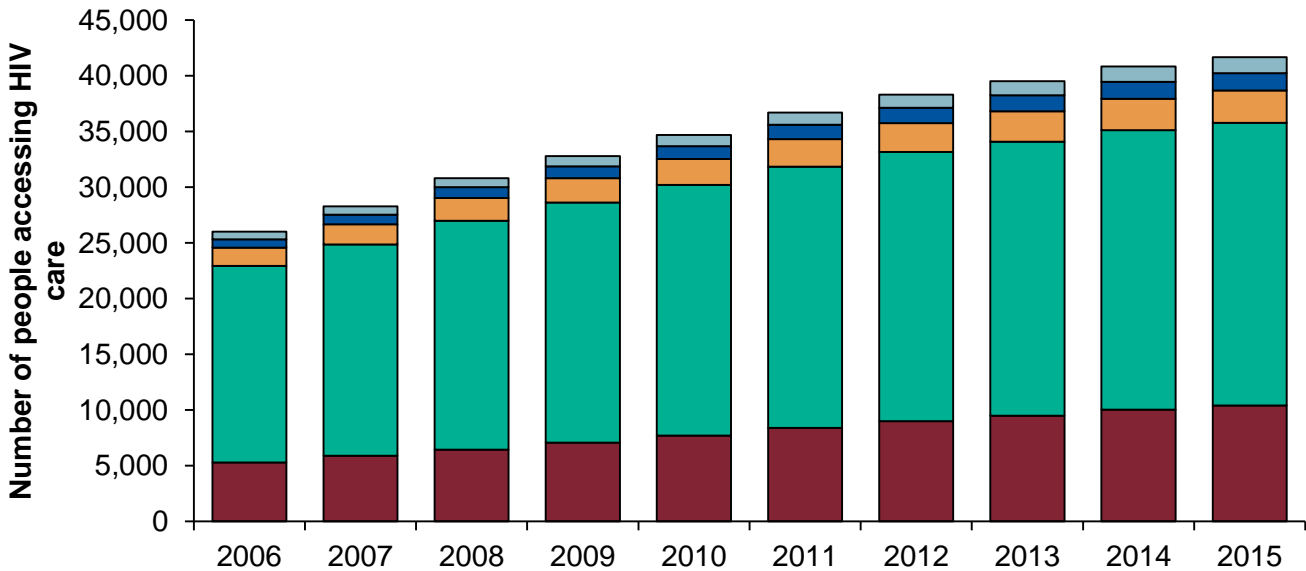
In 2015, one in seven (14%; 5,780/41,920) gay/bisexual men accessing HIV care was from black or other minority ethnic groups, this compares with one in eight (12%; 2,620/22,060) in 2006 (Figure 15a). Among heterosexuals, although black African men and women make up the greatest proportion of those accessing care in 2015 (61%; 25,990/42,710), one in four (25%; 10,700/42,710) heterosexuals were white (Figure 15b), 7% (2,960/42,710) were of black Caribbean/black other ethnicity and 4% (1,600/42,710) reported an Asian ethnicity.

Figure 15: Trends in people diagnosed with HIV accessing HIV specialist care, by ethnicity: UK, 2006-2015

a) Gay/bisexual men



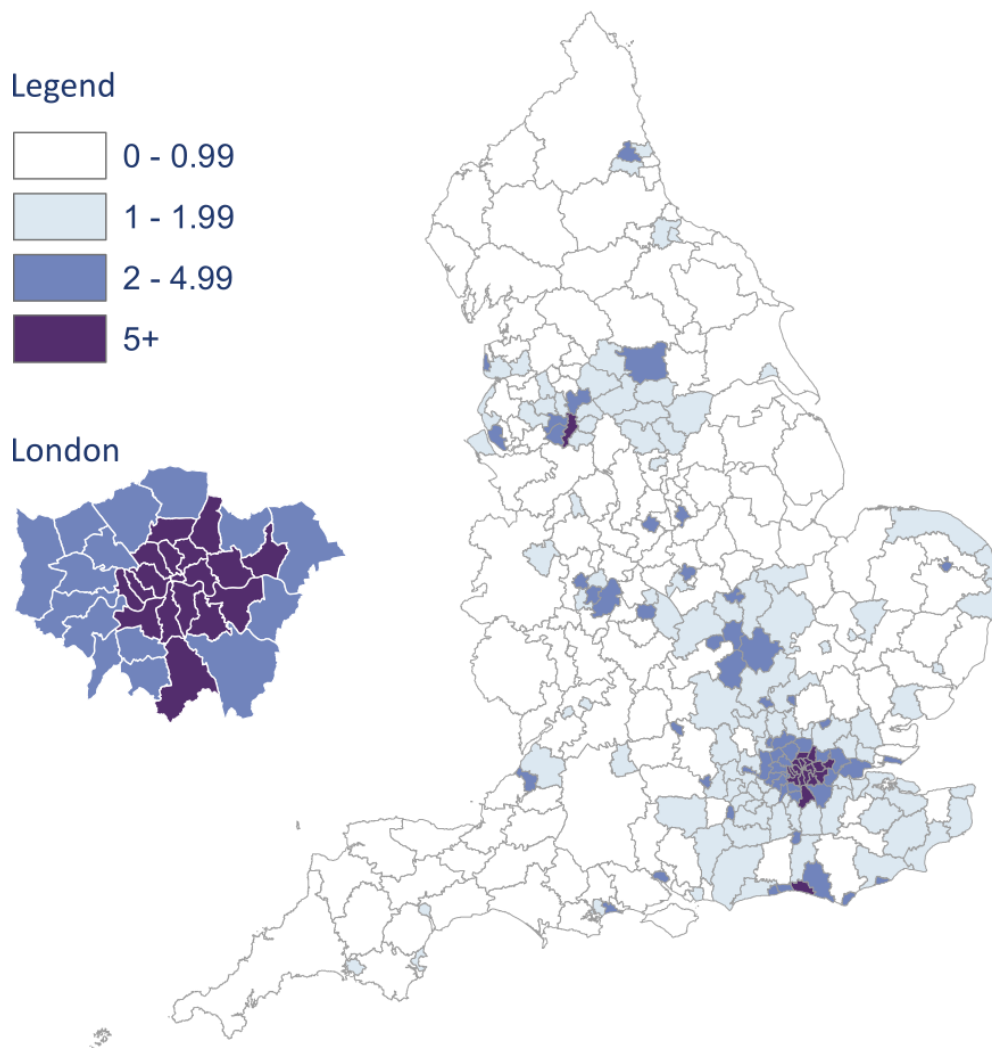
b) Heterosexual men and women



The prevalence of diagnosed HIV varies considerably throughout the UK. Figure 16 shows the diagnosed prevalence per 1,000 population aged 15-59 years, with the darker two shades indicating local authorities (LAs) with a rate of two per 1,000 or higher. In 2015, 74 (23%) out of the 325 LAs in England fell into this category, including all those in London. Eighteen of the 33 LAs in London had a diagnosed HIV prevalence above five per 1,000 population. Outside of London, Manchester and Brighton and Hove had levels over five per 1,000 largely due to high numbers of gay/bisexual men living with diagnosed HIV in this areas (Appendix 6).

Recently revised English testing guidelines, published in 2016 [26], recommend that expanded HIV testing is undertaken in LAs with a diagnosed HIV prevalence above two per 1,000 population. See PHE's 2016 report on HIV testing for further details [7].

Figure 16: Diagnosed HIV prevalence per 1,000 population aged 15-59 years, by local authority of residence: England, 2015



Linkage to HIV care

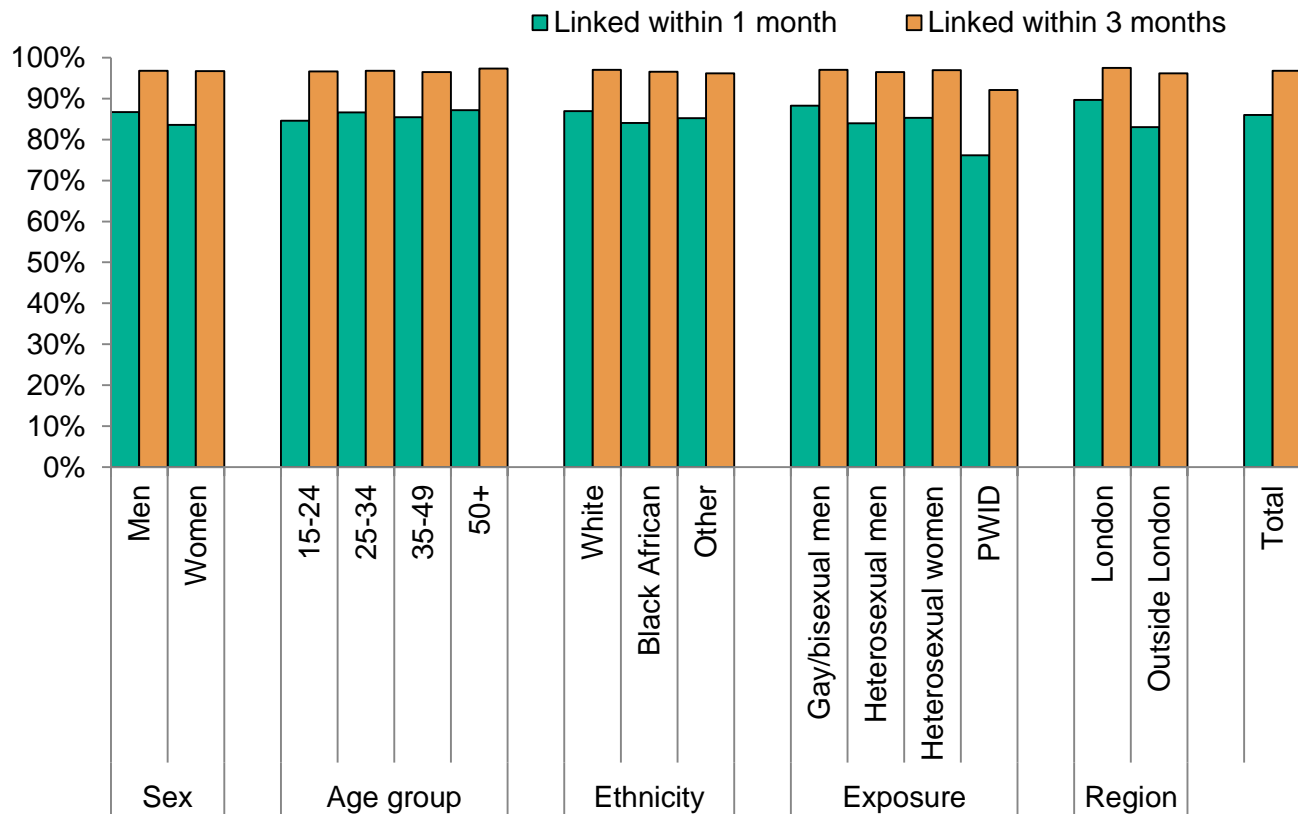
“Attending the HIV clinic gives me as much anonymity as is possible and I believe it is the best place to have specialised care.”

White gay man, aged 40

Prompt linkage to HIV care following an HIV diagnosis is vital in order to ensure that people can access life-saving treatment and reduce the risk of infection to partners. BHIVA investigation and monitoring guidelines [27] recommend that all persons diagnosed with HIV are seen for specialist care and have a baseline CD4 count within two weeks of diagnosis.

In 2015, 75% (3,856/5,149) of people had a baseline CD4 count (conducted as part of initial assessment and therefore used as a proxy for linkage to care) within two weeks, 86% (4,426/5,149) within one month and almost all (97%; 4,981/5149) within three months of HIV diagnosis (Figure 16). Linkage to care was high across almost all demographics and exposure categories, with the exception of people who acquired HIV through injecting of drugs where three quarters (76%; 115/151) were linked to care within a month, compared with 86% (4,311/4,998) among all other exposure groups (Figure 17).

Figure 17: Linkage to care: proportion of adults with a CD4 count within one and three months of diagnosis¹: UK, 2015



¹Excludes 946 individuals diagnosed in 2015 with a CD4 count not reported within 12 months of diagnosis.

Retention in HIV care

The large majority (93%; 79,611/85,396) of adults reported in 2014 were seen again for HIV care in 2015. Rates were similar for all demographics and exposure categories.

Treatment coverage

The revised 2015 WHO and 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 [10, 11].

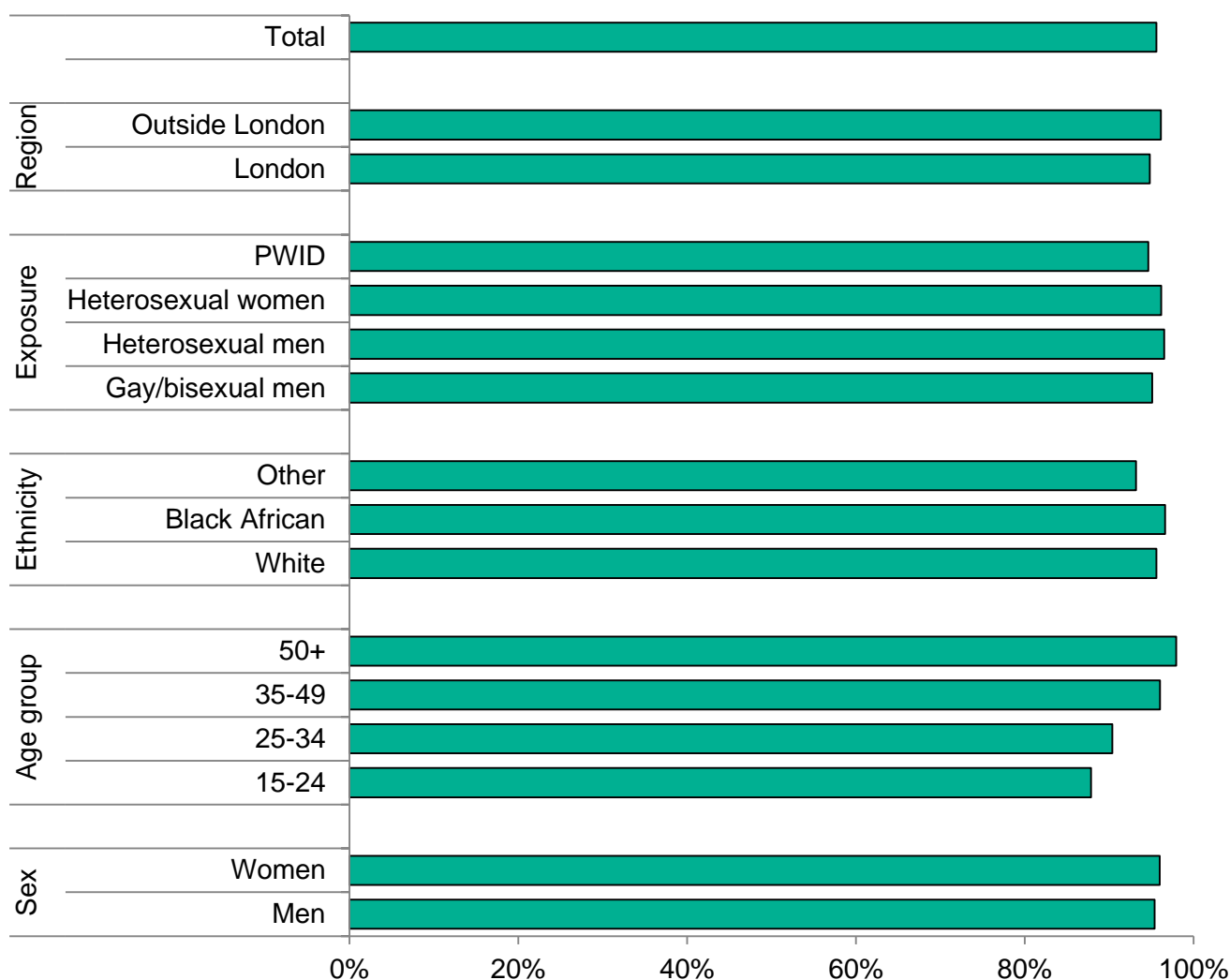
In 2015, 96% (83,931/87,813¹⁵) of people who attended for HIV care in the UK were receiving treatment; this was a marked improvement on the 90% (76,726/85,070¹⁶) receiving treatment in 2014. This increase is likely to reflect the updated treatment guidelines. Treatment coverage was high in all geographies and across exposure categories. However, there was variation in treatment coverage by age, with lower coverage rates among younger people aged 15-24, 88% (2,019/2,298) compared with 98% (29,172/29,811) among those aged 50 and above (Figure 18).

Almost 7,000 people started ART for the first time in 2015. This compares with an average of 5,500 each year between 2010 and 2014. On average, people are starting treatment at an earlier stage of infection. Two-thirds (66%) of people who started treatment in 2015 had a CD4 cell count above 350 cells/mm³ and 41% had a CD4 cell count above 500 cells/mm³. This compares with 22% and 10%, respectively, in 2006.

¹⁵ Excludes 956 people who did not have treatment information reported.

¹⁶ Excludes 326 people who did not have treatment information reported.

Figure 18: Treatment coverage: proportion of adults receiving antiretroviral treatment: UK, 2015



Virological suppression

“I’ve been undetectable for almost 15 years. The latest research has shown the chances of passing on HIV is [almost] zero. That’s excellent news and has lifted the psychological burden and fear I carried for so long about transmitting HIV to someone else.”

Black Caribbean man, aged 47

Virological suppression is defined as having a viral load less than 200 copies/mL (in blood). With effective ART, virological suppression can be achieved for most people living with HIV. People who are virologically suppressed are very unlikely to pass on their HIV infection through sexual contact [2] and UNAIDS has set the target that 90% of people receiving treatment should be virologically suppressed.

In 2015, 94% (67,628/71,812) of people receiving treatment in the UK with a reported viral load had an undetectable viral load. Applying this proportion results in 89% of all people living with diagnosed HIV and 78% of all (diagnosed and undiagnosed) people living with HIV in the UK with a suppressed viral load¹⁷.

¹⁷ Viral load information was missing for 14% (12,119) of patients receiving treatment. If the unlikely scenario is assumed that all missing values related to people with unsuppressed viraemia, the proportion of the diagnosed population who are virally suppressed reduces to 76%.

Experiences of people living with HIV

“When I was diagnosed HIV positive it was a very important moment in my life but being HIV positive is not something that defines me necessarily so is actually a very small part of me.”

White bisexual man, aged 32

The outlook for people living with HIV in the UK has changed considerably over the past 20 years, with better treatment, increased survival and improved quality of life. Improvements in treatment coverage have also eliminated the risk of transmission for the majority. Stronger anti-discrimination laws and policies protecting human rights should also contribute towards an improved quality of life for people living with HIV.

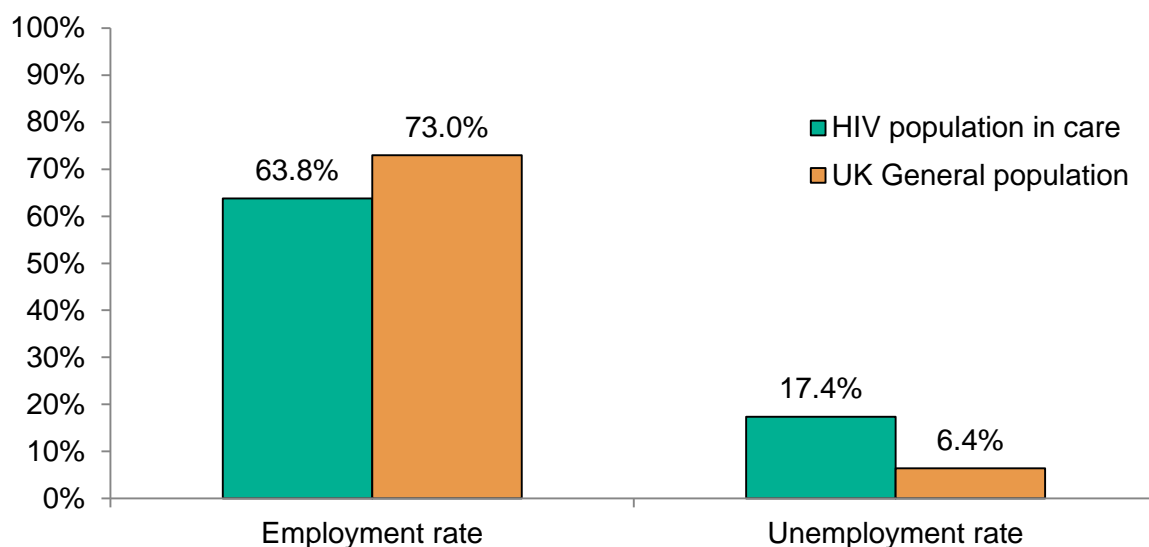
In 2014, PHE’s Positive Voices survey collected the first round of nationally representative patient-reported data on a range of health and social issues from a sample of 788 people living with HIV recruited from 30 HIV clinics across England and Wales [28]. The majority of people living with HIV describe their overall health to be good or very good (75%) and their clinical care as excellent and the vast majority adhered to their HIV treatments (93%). Gathering the experiences of people living with HIV is an important aspect of monitoring the quality of health care delivered through the NHS.

People with HIV reported exceptionally high levels of satisfaction with their HIV specialist services, with an average rating of 96 out of 100 (IQR 90-100). Satisfaction with HIV services was particularly high with regards to having enough information about HIV, feeling supported to self-manage HIV and being involved in decisions about care. In the previous year, 35% of people with HIV had accessed HIV support outside the HIV clinic, most commonly for information about living with HIV, treatment advice, peer support or social contact with other people living with HIV.

However, despite good self-reported health, about 60% of the participants were classified as overweight or obese. Co-morbidities were common and almost half of participants reported taking at least one type of medication in addition to their HIV treatment.

Social inequity was also documented, with high rates of unemployment and poverty. Despite higher educational attainment than the general population, the employment rate among those with HIV aged 16-64 was 64% compared with 73% in the UK population during the same period [29] (Figure 19). People living with HIV reported more financial difficulty, with 15% having fallen behind with some bills, compared with 6% of the UK population.

Figure 19: Employment and unemployment rate among people in HIV care compared with the general population[29], ages 16-64: UK, 2014



People also continue to report experiences of stigma and discrimination related to their HIV status. The People Living with HIV Stigma Survey UK 2015 was a collaborative community-led initiative in partnership with PHE that captured the experiences of living with HIV in 2015. A total of 1,576 people, recruited from 120 community organisations and 47 HIV clinics throughout the UK, completed an anonymous online survey [30]. Two-thirds of participants felt positive about their life and in control of their health. However, levels of self-stigma were high with around half reporting shame, guilt or self-blame in relation to their HIV status and one in five reporting that they had felt suicidal. Furthermore, a high proportion of participants worried about being gossiped about (27%), had avoided family or social gatherings (11%) and had experienced sexual rejection (20%) in the past year. To address stigma and discrimination, the majority of participants in the survey supported increased education (66%) and awareness campaigns (55%).

“I am who I am – nothing will change that, just proud that I managed to accept my condition. Let’s stand up and support each other, never give a chance to be outcast.”

Black African woman, aged 46

“We are proud to be delivering such outstanding levels of care to those who are accessing it. More than nine out of 10 (96%) of those attending HIV clinics are on treatment and of these 94% have well-controlled HIV and are not infectious to others. However, the fact that 39% of newly diagnosed patients are being diagnosed late remains deeply troubling. This phenomenon is most significant among heterosexual men and women who are not recognised as being at risk and therefore remain undiagnosed for too long. We must continue to push for all doctors in emergency departments, GP surgeries and general hospital settings to be adequately funded and fully empowered to offer and undertake HIV testing.”

Dr Chloe Orkin, chair of the British HIV Association (BHIVA)

References

1. Cohen, M.S., et al., *Prevention of HIV-1 infection with early antiretroviral therapy*. N Engl J Med, 2011. **365**(6): p. 493-505.
2. Rodger, A.J., et al., *Sexual Activity Without Condoms and Risk of HIV Transmission in Serodifferent Couples When the HIV-Positive Partner Is Using Suppressive Antiretroviral Therapy*. JAMA, 2016. **316**(2): p. 171-81.
3. Brown, A.E., et al., *Auditing national HIV guidelines and policies: The United Kingdom CD4 Surveillance Scheme*. Open AIDS J, 2012. **6**: p. 149-55.
4. Croxford, S., et al., *Mortality and causes of death among people diagnosed with HIV in the era of highly active antiretroviral therapy compared to the general population: analysis of a national observational cohort*. 2016 (in press).
5. Brown, A.E., O.N. Gill, and V.C. Delpech, *HIV treatment as prevention among men who have sex with men in the UK: is transmission controlled by universal access to HIV treatment and care?* HIV Med, 2013. **14**(9): p. 563-70.
6. *Shooting Up: Infections among people who inject drugs in the UK, 2015*. An update: November 2016, Public Health England.
7. *HIV testing in England*. 2016, Public Health England; Available from: <https://www.gov.uk/guidance/hiv-testing>.
8. Pufall, E.L., et al., *Chemsex and High-Risk Sexual Behaviours in HIV-Positive Men Who Have Sex With Men*, in *Conference on Retroviruses and Opportunistic Infections (CROI)*. 2016.
9. *HIV/AIDS surveillance in Europe 2015*. European Centre for Disease Prevention and Control; Available from: <http://ecdc.europa.eu/en/healthtopics/aids/surveillance-reports/Pages/surveillance-reports.aspx>.
10. *Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV*. 2015, World Health Organisation; Available from: http://apps.who.int/iris/bitstream/10665/186275/1/9789241509565_eng.pdf.
11. *Guidelines for the treatment of HIV-1-positive adults with antiretroviral therapy 2015*. (2016 interim update), British HIV Association; Available from: <http://bhiva.org/documents/Guidelines/Treatment/2016/treatment-guidelines-2016-interim-update.pdf>.
12. *90-90-90 An ambitious treatment target to help end the AIDS epidemic*. 2014, Joint United Nations Programme on HIV/AIDS (UNAIDS); Available from: http://www.unaids.org/sites/default/files/media_asset/90-90-90_en_0.pdf.
13. Goubar, A., et al., *Estimates of human immunodeficiency virus prevalence and proportion diagnosed based on Bayesian multiparameter synthesis of surveillance data*. Journal of the Royal Statistical Society, 2008. **171**(3): p. 541-580.
14. Bourne, A., D. Reid, and P. Weatherburn. *African Health & Sex Survey 2013-2014: headline findings*. Available from: <http://sigmaresearch.org.uk/files/report2014c.pdf>.
15. Prah, P., et al., *Men who have sex with men in Great Britain: comparing methods and estimates from probability and convenience sample surveys*. Sex Transm Infect, 2016. **92**(6): p. 455-63.
16. Nakagawa, F., et al., *An epidemiological modelling study to estimate the composition of HIV-positive populations including migrants from endemic settings: an application in the United Kingdom*. 2016 (in press).

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. Davis, D.H., et al., *Early diagnosis and treatment of HIV infection: magnitude of benefit on short-term mortality is greatest in older adults*. *Age Ageing*, 2013. **42**(4): p. 520-6.
20. 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).
21. *Deaths by single year of age tables - UK*. 2015, Office for National Statistics; Available from:
<http://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathregistrationssummarytablesenglandandwalesdeathsbyingleyearofageables>.
22. *Use of high burden country lists for TB by WHO in the post-2015 era*. 2015, World Health Organisation; Available from:
http://www.who.int/tb/publications/global_report/high_tb_burden-country-lists-2016-2020.pdf.
23. *Guidelines for the treatment of TB/HIV coinfection*. 2011, British HIV Association; Available from: http://www.bhiva.org/documents/Guidelines/TB/hiv_954_online_final.pdf.
24. Bennett, D.E., et al., *Drug resistance mutations for surveillance of transmitted HIV-1 drug-resistance: 2009 update*. *PLoS One*, 2009. **4**(3): p. e4724.
25. Tostevin, A., et al., *Recent trends and patterns in HIV-1 transmitted drug resistance in the United Kingdom*. *HIV Med*, 2016.
26. *HIV and AIDS testing guidelines*. 2016, National Institute for Health and Care Excellence; Available from: <https://www.nice.org.uk/guidance/conditions-and-diseases/infections/hiv-and-aids>.
27. *Guidelines for the routine investigation and monitoring of adult HIV-1-positive individuals*. 2016, British HIV Association; Available from:
<http://www.bhiva.org/documents/Guidelines/Monitoring/2016-BHIVA-Monitoring-Guidelines.pdf>.
28. Kall, M.M., et al., *Patient experience with NHS HIV specialist services: results from the Positive Voices pilot survey*, in *British HIV Association (BHIVA)*. 2015.
29. *Regional labour market statistics in the UK: August 2014*. Office for National Statistics; Available from: <https://www.gov.uk/government/statistics/regional-labour-market-statistics-august-2014>.
30. *The People Living With HIV Stigma Survey UK: National findings*. 2015; Available from:
<http://www.stigmaindexuk.org/reports/2016/NationalReport.pdf>.

Appendices

Appendix 1: Estimated number of people living with HIV (both diagnosed and undiagnosed) by exposure category: UK, 2015

| Exposure category | Number diagnosed (credible interval) ¹ | Number undiagnosed (credible interval) ¹ | Total (credible interval) ¹ | % Undiagnosed (credible interval) ¹ |
|---------------------------------------|--|--|--|---|
| Gay/bisexual men | 41,180 (40,440, 42,030) | 5,830 (3,199, 9,639) | 47,040 (44,219, 50,860) | 12% (7, 19%) |
| People who inject drugs | 2,183 (1,967, 2,315) | 315 (156, 568) | 2,495 (2,221, 2,785) | 13% (7, 21%) |
| Heterosexuals | 42,240 (41,530, 43,110) | 7,190 (5,769, 9,459) | 49,470 (47,750, 51,920) | 15% (12, 18%) |
| Men | 16,390 (16,110, 16,700) | 3,149 (2,239, 5,010) | 19,550 (18,550, 21,470) | 16% (12, 23%) |
| Black African men | 8,256 (8,083, 8,442) | 1,001 (682, 1,541) | 9,264 (8,873, 9,838) | 11% (8, 16%) |
| Men excluding black Africans | 8,135 (7,960, 8,320) | 2,134 (1,332, 3,779) | 10,280 (9,448, 11,940) | 21% (14, 32%) |
| Women | 25,860 (25,330, 26,480) | 4,000 (3,280, 4,900) | 29,870 (28,900, 31,020) | 13% (11, 16%) |
| Black African women | 17,450 (17,060, 17,890) | 1,859 (1,430, 2,410) | 19,310 (18,710, 20,040) | 10% (8, 12%) |
| Women excluding black Africans | 8,410 (8,190, 8,667) | 2,128 (1,567, 2,860) | 10,550 (9,910, 11,330) | 20% (16, 25%) |
| Total² | 87,670 (86,290, 89,320) | 13,460 (10,229, 17,820) | 101,200 (97,469, 105,700) | 13% (10, 17%) |

¹ Lower bound, upper bound.

² Numbers may not add to total due to rounding and exclusion of data relating to HIV acquired through mother-to-child transmission and blood related products.

Appendix 2: Estimated number of people living with HIV (both diagnosed and undiagnosed) by exposure category and region of residence: London, England and Wales, 2015

| Exposure category | London | | | England and Wales (excluding London) | | |
|---------------------------------------|--|---|---|--|---|---|
| | Number undiagnosed (credible interval) ¹ | Total (credible interval) ¹ | % Undiagnosed (credible interval) ¹ | Number undiagnosed (credible interval) ¹ | Total (credible interval) ¹ | % Undiagnosed (credible interval) ¹ |
| Gay/bisexual men | 2,129 (719, 5,400) | 20,635 (19,140, 23,920) | 10% (4, 23%) | 2,470 (909, 4,780) | 22,700 (21,100, 25,030) | 11% (4, 19%) |
| People who inject drugs | 103 (45, 206) | 809 (704, 931) | 13% (6, 23%) | 161 (68, 312) | 1,181 (1,028, 1,356) | 14% (6, 23%) |
| Heterosexuals | 2,140 (1,520, 3,090) | 18,000 (17,280, 18,980) | 12% (9, 16%) | 4,430 (3,310, 6,260) | 28,790 (27,500, 30,700) | 15% (12, 20%) |
| Men | 826 (504, 1,488) | 6,811 (6,439, 7,494) | 12% (8, 20%) | 2,014 (1,295, 3,486) | 11,510 (10,740, 13,010) | 18% (12, 27%) |
| Black African men | 370 (213, 666) | 3,689 (3,495, 3,994) | 10% (6, 17%) | 556 (348, 950) | 5,202 (4,939, 5,617) | 11% (7, 17%) |
| Men excluding black Africans | 434 (204, 1,022) | 3,102 (2,840, 3,697) | 14% (7, 28%) | 1,441 (797, 2,796) | 6,294 (5,627, 7,654) | 23% (14, 37%) |
| Women | 1,292 (928, 1,800) | 11,170 (10,710, 11,740) | 12% (9, 15%) | 2,390 (1,859, 3,119) | 17,250 (16,560, 18,120) | 14% (11, 17%) |
| Black African women | 731 (486, 1,111) | 7,751 (7,432, 8,172) | 9% (6, 14%) | 1,009 (730, 1,422) | 10,900 (10,490, 11,400) | 9% (7, 13%) |
| Women excluding black Africans | 545 (312, 917) | 3,401 (3,133, 3,784) | 16% (10, 24%) | 1,359 (935, 1,990) | 6,334 (5,864, 7,001) | 21% (16, 29%) |
| Total² | 4,420 (2,810, 7,809) | 40,250 (38,470, 43,630) | 11% (7, 18%) | 7,160 (5,100, 9,870) | 53,960 (51,670, 56,790) | 13% (10, 17%) |

¹ Lower bound, upper bound.

² Numbers may not add to total due to rounding and exclusion of data relating to HIV acquired through mother-to-child transmission and blood related products.

Appendix 3: Comparison of estimates for number of people living with HIV (both diagnosed and undiagnosed) using previously published and revised methods: UK, 2014

| Exposure category | 2014 estimates (2016 method) | | | 2014 estimates (2015 method) | | |
|---------------------------------------|---|---|--|---|--|--|
| | Number undiagnosed (credible interval) ¹ | Total (credible interval) ¹ | % Undiagnosed (credible interval) ¹ | Number undiagnosed (credible interval) ¹ | Total (credible interval) ¹ | % Undiagnosed (credible interval) ¹ |
| Gay/bisexual men | 5,879 (3,129, 10,249) | 44,480 (41,620, 48,950) | 13% (8, 21%) | 6,490 (3,529, 10,899) | 44,980 (41,930, 49,460) | 14% (8, 22%) |
| People who inject drugs | 229 (127, 412) | 2,152 (1,916, 2,380) | 11% (6, 18%) | 243 (135, 440) | 2,162 (1,918, 2,405) | 11% (7, 19%) |
| Heterosexuals | 6,989 (5,750, 8,609) | 48,620 (47,040, 50,460) | 14% (12, 17%) | 11,160 (6,240, 18,920) | 54,050 (49,010, 61,920) | 21% (13, 31%) |
| Men | 2,940 (2,080, 4,260) | 18,470 (17,510, 19,800) | 16% (12, 22%) | 5,100 (2,750, 8,839) | 21,290 (18,910, 25,050) | 24% (15, 35%) |
| Black African ethnicity | 1,262 (830, 1,884) | 9,207 (8,706, 9,841) | 14% (9, 19%) | 1,530 (291, 3,884) | 9,845 (8,586, 12,220) | 16% (3, 32%) |
| Men excluding black Africans | 1,649 (1,051, 2,707) | 9,238 (8,591, 10,290) | 18% (12, 26%) | 3,570 (1,815, 6,982) | 11,445 (9,671, 14,880) | 31% (19, 47%) |
| Women | 4,020 (3,420, 4,720) | 30,110 (29,200, 31,140) | 13% (12, 15%) | 6,000 (3,369, 10,509) | 32,680 (29,950, 37,350) | 18% (11, 28%) |
| Black African ethnicity | 2,300 (1,879, 2,830) | 19,620 (18,980, 20,340) | 12% (10, 14%) | 2,380 (479, 6,090) | 20,120 (18,130, 23,900) | 12% (3, 26%) |
| Women excluding black Africans | 1,705 (1,334, 2,195) | 10,490 (10,010, 11,070) | 16% (13, 20%) | 3,620 (1,851, 5,535) | 12,560 (10,790, 14,540) | 29% (17, 38%) |
| Total² | 13,149 (10,000, 17980) | 97,610 (94,069, 102,700) | 13% (11, 18%) | 18,090 (12,100, 26,880) | 103,700 (97,500, 112,700) | 17% (12, 24%) |

¹ Lower bound, upper bound.

² Numbers may not add to total due to rounding and exclusion of data relating to HIV acquired through mother-to-child transmission and blood related products.

Appendix 4: Number and proportion of likely recently acquired infections at diagnosis (ascertained through the Recent Infection Testing Algorithm) by exposure category and age group: England, Wales and Northern Ireland, 2015^{1,2}

| Exposure category | | 15-24 | 25-34 | 35-49 | 50-64 | Total |
|---------------------------|--------------------|---------|---------|---------|---------|---------|
| Gay/bisexual men | Recent infections | 79 | 198 | 125 | 27 | 429 |
| | Number RITA tested | 246 | 677 | 508 | 158 | 1,589 |
| | % | 32% | 29% | 25% | 17% | 27% |
| | 95% C.I. | (26-38) | (26-33) | (21-29) | (12-24) | (25-29) |
| Heterosexual men | Recent infections | 3 | 15 | 12 | 10 | 40 |
| | Number RITA tested | 18 | 94 | 174 | 118 | 404 |
| | % | 17% | 16% | 7% | 8% | 10% |
| | 95% C.I. | (4-41) | (9-25) | (4-12) | (4-15) | (7-13) |
| Heterosexual women | Recent infections | 6 | 16 | 13 | 5 | 40 |
| | Number RITA tested | 46 | 150 | 231 | 89 | 516 |
| | % | 13% | 11% | 6% | 6% | 8% |
| | 95% C.I. | (5-26) | (6-17) | (3-9) | (2-13) | (6-10) |
| All heterosexuals | Recent infections | 9 | 31 | 25 | 15 | 80 |
| | Number RITA tested | 64 | 244 | 405 | 207 | 920 |
| | % | 14% | 13% | 6% | 7% | 9% |
| | 95% C.I. | (7-25) | (9-18) | (4-9) | (4-11) | (7-11) |
| Total | Recent infections | 98 | 240 | 159 | 46 | 543 |
| | Number RITA tested | 355 | 1,008 | 1,035 | 425 | 2,823 |
| | % | 28% | 24% | 15% | 11% | 19% |
| | 95% C.I. | (23-33) | (21-27) | (13-18) | (8-14) | (18-21) |

¹ Ascertained through the Recent Infection Testing Algorithm (RITA).

² Overall, nearly 50% of new HIV diagnoses had a test for recent infection; this was similar across all exposure categories.

Appendix 5: Rates of late diagnosis (CD4 count <350 cells/mm³) by exposure group, ethnicity and gender: England, 2013-2015

| Exposure Group | Ethnicity | Gender | Measure | London | Midlands and East of England | North of England | South of England | England total |
|--------------------------------|----------------------|------------------------------------|------------------------------------|--------|------------------------------|------------------|------------------|---------------|
| Gay/bisexual men | | | Number of diagnoses with CD4 count | 4,025 | 1,101 | 1,325 | 1,152 | 7,603 |
| | | | Number with CD4 count <350 | 929 | 410 | 509 | 383 | 2,231 |
| | | | % diagnosed late | 23% | 37% | 38% | 33% | 29% |
| Heterosexual contact | Black African | Male | Number of diagnoses with CD4 count | 405 | 239 | 155 | 115 | 914 |
| | | | Number with CD4 count <350 | 233 | 165 | 113 | 74 | 585 |
| | | | % diagnosed late | 58% | 69% | 73% | 64% | 64% |
| | | Female | Number of diagnoses with CD4 count | 719 | 415 | 259 | 190 | 1,583 |
| | | | Number with CD4 count <350 | 384 | 219 | 146 | 111 | 860 |
| | | | % diagnosed late | 53% | 53% | 56% | 58% | 54% |
| | White | Male | Number of diagnoses with CD4 count | 233 | 233 | 244 | 210 | 920 |
| | | | Number with CD4 count <350 | 107 | 134 | 140 | 116 | 497 |
| | | | % diagnosed late | 46% | 58% | 57% | 55% | 54% |
| | | Female | Number of diagnoses with CD4 count | 176 | 211 | 174 | 158 | 719 |
| | | | Number with CD4 count <350 | 72 | 98 | 79 | 63 | 312 |
| | | | % diagnosed late | 41% | 46% | 45% | 40% | 43% |
| | Other | Male | Number of diagnoses with CD4 count | 251 | 104 | 58 | 58 | 471 |
| | | | Number with CD4 count <350 | 144 | 63 | 39 | 33 | 279 |
| | | | % diagnosed late | 57% | 61% | 67% | 57% | 59% |
| Female | | Number of diagnoses with CD4 count | 264 | 140 | 71 | 83 | 558 | |
| | | Number with CD4 count <350 | 120 | 76 | 30 | 47 | 273 | |
| | | % diagnosed late | 45% | 54% | 42% | 57% | 49% | |
| People who inject drugs | | | Number of diagnoses with CD4 count | 102 | 73 | 38 | 69 | 282 |
| | | | Number with CD4 count <350 | 54 | 38 | 23 | 32 | 147 |
| | | | % diagnosed late | 53% | 52% | 61% | 46% | 52% |

Appendix 6: Local Authorities (LAs) with diagnosed HIV prevalence rates above 2 per 1,000 population¹: England, 2015

| HIV prevalence category | Local Authority name | Residents accessing HIV related care (aged 15-59) | Estimated resident population in 1,000s ² (aged 15-59) | Diagnosed HIV prevalence per 1,000 (aged 15-59) |
|-------------------------|------------------------|---|---|---|
| 5+ | Lambeth | 3,429 | 234.82 | 14.60 |
| | City of London | 77 | 5.95 | 12.95 |
| | Southwark | 2,795 | 219.98 | 12.71 |
| | Kensington and Chelsea | 935 | 103.11 | 9.07 |
| | Westminster | 1,488 | 167.32 | 8.89 |
| | Hammersmith and Fulham | 1,041 | 124.54 | 8.36 |
| | Lewisham | 1,662 | 201.12 | 8.26 |
| | Islington | 1,370 | 166.01 | 8.25 |
| | Camden | 1,339 | 164.10 | 8.16 |
| | Hackney | 1,532 | 188.89 | 8.11 |
| | Brighton and Hove | 1,544 | 192.51 | 8.02 |
| | Haringey | 1,306 | 186.15 | 7.02 |
| | Newham | 1,523 | 227.53 | 6.69 |
| | Tower Hamlets | 1,388 | 213.39 | 6.5 |
| | Greenwich | 1,148 | 178.94 | 6.42 |
| | Barking and Dagenham | 759 | 123.07 | 6.17 |
| | Manchester | 2,101 | 361.83 | 5.81 |
| | Wandsworth | 1,238 | 221.25 | 5.6 |
| | Croydon | 1,251 | 233.41 | 5.36 |
| | Waltham Forest | 886 | 176.67 | 5.02 |
| 2 - 4.99 | Salford | 757 | 152.94 | 4.95 |
| | Brent | 904 | 209.71 | 4.31 |
| | Luton | 569 | 132.27 | 4.30 |
| | Merton | 552 | 131.11 | 4.21 |
| | Enfield | 837 | 202.04 | 4.14 |
| | Hounslow | 667 | 173.04 | 3.85 |
| | Leicester | 832 | 217.72 | 3.82 |
| | Blackpool | 303 | 79.5 | 3.81 |
| | Ealing | 756 | 217.76 | 3.47 |
| | Slough | 313 | 90.75 | 3.45 |
| | Northampton | 436 | 135.32 | 3.22 |
| | Crawley | 221 | 68.68 | 3.22 |
| | Coventry | 696 | 217.35 | 3.20 |
| | Bournemouth | 371 | 120.67 | 3.07 |
| | Reading | 318 | 104.58 | 3.04 |

| | | | | |
|---------------------|----------------------|--------|--------|------|
| 2 - 4.99 | Barnet | 700 | 234.49 | 2.99 |
| | Milton Keynes | 472 | 158.43 | 2.98 |
| | Wolverhampton | 446 | 150.08 | 2.97 |
| | Nottingham | 619 | 213.00 | 2.91 |
| | Redbridge | 516 | 183.96 | 2.8 |
| | Southend-on-Sea | 287 | 102.94 | 2.79 |
| | Watford | 168 | 60.23 | 2.79 |
| | Harlow | 141 | 50.64 | 2.78 |
| | Bexley | 385 | 143.78 | 2.68 |
| | Bromley | 513 | 191.19 | 2.68 |
| | Birmingham | 1,818 | 680.53 | 2.67 |
| | Hillingdon | 490 | 186.31 | 2.63 |
| | Worthing | 156 | 59.89 | 2.6 |
| | Corby | 104 | 40.29 | 2.58 |
| | Sandwell | 487 | 189.17 | 2.57 |
| | Leeds | 1,193 | 480.72 | 2.48 |
| | Richmond upon Thames | 291 | 118.14 | 2.46 |
| | Stevenage | 127 | 52.74 | 2.41 |
| | Bedford | 231 | 97.39 | 2.37 |
| | Harrow | 356 | 150.04 | 2.37 |
| | Sutton | 288 | 121.68 | 2.37 |
| | Wellingborough | 98 | 43.40 | 2.26 |
| | Hastings | 119 | 52.66 | 2.26 |
| | Eastbourne | 121 | 55.33 | 2.19 |
| | Lewes | 115 | 52.89 | 2.17 |
| | Southampton | 353 | 164.19 | 2.15 |
| | Derby | 325 | 151.94 | 2.14 |
| | Bristol, City of | 626 | 292.06 | 2.14 |
| | Kingston upon Thames | 236 | 110.88 | 2.13 |
| | Adur | 73 | 34.35 | 2.13 |
| | Norwich | 189 | 89.93 | 2.1 |
| | Havering | 304 | 145.16 | 2.09 |
| | Trafford | 282 | 136.14 | 2.07 |
| | Rochdale | 257 | 125.62 | 2.05 |
| Hertsmere | 121 | 59.35 | 2.04 | |
| Thurrock | 202 | 99.63 | 2.03 | |
| Newcastle upon Tyne | 385 | 190 | 2.03 | |
| Oxford | 221 | 109.90 | 2.01 | |
| Rushmoor | 120 | 59.84 | 2.01 | |

¹ Complete list of diagnosed HIV prevalence rates available from: www.gov.uk/government/statistics/hiv-annual-data-tables

² Population data from Office for National Statistics mid-2015 population estimate.

Appendix 7: List of data sources and associated measures

| Data source | Description | Geographical coverage | Measures |
|--|--|--|---|
| HIV and AIDS Reporting System (HARS) | National HIV surveillance: Linked dataset of people newly diagnosed and seen for HIV care, includes the Recent Infection Testing Algorithm and CD4 surveillance scheme. Data is deduplicated across regions and therefore figures may differ from country-specific data (www.gov.uk/government/collections/hiv-surveillance-data-and-management) | National, England, Wales and Northern Ireland (RITA) | New HIV and AIDS diagnoses, recent infection, late HIV diagnoses, one-year mortality, people seen for HIV care, linkage to HIV care, retention in HIV care, treatment coverage, virological suppression, diagnosed HIV prevalence |
| Multi-parameter Evidence Synthesis (MPES) | Bayesian multi-parameter evidence synthesis model, reviewed each year to take into account changes in data sources [13] | National, England and Wales, London | Diagnosed and undiagnosed HIV prevalence among the general population and key groups |
| HIV synthesis progression model | Stochastic simulation model, calibrated to HIV surveillance data [16] | National | Undiagnosed HIV prevalence and incidence among the general population |
| CD4 back-calculation model | CD4-based Bayesian back-calculation model [17] | England | Undiagnosed HIV prevalence and incidence among gay/bisexual men |
| Probable country of acquisition | CD4 decline model to estimate country of infection for those born abroad [18] | National | Probable country of acquisition by exposure group |
| UK HIV Drug Resistance Database | Molecular surveillance dataset with sequence data for transmitted drug resistance (www.hivrdb.org.uk) | National | Transmitted drug resistance by drug class and exposure group |
| Enhanced Tuberculosis Surveillance System | Data on laboratory isolates and case notifications for TB cases (www.gov.uk/government/collections/tuberculosis-and-other-mycobacterial-diseases-diagnosis-screening-management-and-data) | England, Wales and Northern Ireland | Tuberculosis incidence among people living with HIV |
| National Study of HIV in Pregnancy and Childhood | Data on pregnant women living with HIV and their children from the Institute of Child Health (www.ucl.ac.uk/nshpc) | National | Mother to child transmission of HIV |
| Positive Voices 2014 | PHE-led patient-reported survey data on a range of health and social issues, in collaboration with University College London and Imperial College London (www.ucl.ac.uk/voices) | National | Satisfaction with HIV services, health status, adherence to HIV treatment, co-morbidities, social inequity |
| The People Living with HIV Stigma Survey UK 2015 | Survey data on the experiences of living with HIV in 2015, PHE in collaboration with people living with HIV and FPA (www.stigmaindexuk.org) | National | Stigma and discrimination related to HIV |
| Office for National Statistics | Population data (www.ons.gov.uk) | National | UK population, mortality rates |