



UK Health  
Security  
Agency

# **HIV testing, new HIV diagnoses, outcomes and quality of care for people accessing HIV services: 2021 report**

The annual official statistics data release  
(data to end of December 2020)

1 December 2021

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## Main messages

The focus of the report is on England to coincide with the release of the English HIV Action Plan on 1 December 2021.

## Impact of COVID-19 pandemic on the HIV situation

The coronavirus (COVID-19) pandemic changed patterns of sexual behaviour, HIV testing and access to sexual health and HIV services in 2020.

Compared to 2019, the number of people tested for HIV at sexual health services (SHS) decreased by 30% in 2020 and almost half (47%) of the 927,760 people testing in 2020 did so online.

Fewer people accessed HIV care in 2020. It was expected that 93,780 people with diagnosed HIV infection would attend HIV services in 2020; however, only 88,800 people did. This means that 4,980 to 6,960 people with diagnosed HIV infection were not seen for care (virtually or face to face) in 2020; the latter is double the equivalent measure reported in 2019 (3,600). Delivery of HIV care also changed with telephone consultations increasing from 7,910 in 2019 to 59,280 in 2020.

The number of patients with reports of CD4 and viral load data available decreased by 19% and 11% between 2019 and 2020 in England, respectively. This was partly due to fewer CD4 and viral load tests conducted in HIV outpatient settings. Staff shortages and redeployment also had an impact on data collection, collation and analyses. Data for Scotland for 2020 is unavailable and data completeness and quality were compromised in other nations of the UK. Consequently, this year's HIV annual report focuses primarily on England. The impact of COVID-19 pandemic on service provision and data reporting mean that the main metrics to monitor the national HIV epidemic were complex to measure and interpret.

## Total number of people living with HIV

In 2020, an estimated 97,740 (95% credible interval (95% CrI) 96,400 to 100,060) people were living with HIV in England and an estimated 4,660 in 2020 (95%CrI 3,640 to 6,980) were unaware of their infection. The equivalent figures for the UK were 106,890 (95% CrI 105,460 to 109,510) and 5,150 (95% CrI 4,000 to 7,770).

The number of people with an undiagnosed HIV infection in England fell from 6,550 (95% CrI 4,790 to 9,700) in 2018, to 5,560 (95% CrI 4,190 to 8,030) in 2019 and 4,660 in 2020 (95%CrI 3,640 to 6,980). Nearly twice as many people with undiagnosed HIV infection lived outside of London (3,000; 95% CrI 2,260 to 4,780) compared with those living in London (1,650; 95% CrI 1,200 to 2,470).

## HIV testing

In 2020, the number of people who tested for HIV at SHS in England fell by 30% from 1,320,510 in 2019 to 927,760. This decline was not equal between population groups.

Among gay, bisexual and other men who have sex with men, the number having an HIV test at SHS fell by 7% from 157,710 in 2019 to 146,900 in 2020 but remained higher than in 2018 (132,770). Furthermore, the number of frequent testers (at least 2 tests within a year) remained high; many of these frequent testers may have been receiving Pre-Exposure Prophylaxis (PrEP).

By contrast, the number of heterosexuals tested for HIV fell sharply by 33% (from 1,142,950 in 2019 to 760,260 in 2020). Similar drops in testing were observed among Black African heterosexuals (34% for men and 24% for women) and White heterosexuals (43% and 30%, respectively). The proportion of heterosexuals offered an HIV test at SHS in 2020 reduced from 83% in 2019 to 60% in 2020 (87% and 67%, respectively, among Black African heterosexuals). This decline is likely due to a shift to more telephone consultations at SHS.

## New HIV diagnoses and incidence

The number of all new HIV diagnoses decreased by 33% in England (from 3,950 in 2019 to 2,630 in 2020). The number of diagnoses first made in England (76% of all diagnoses) fell by 33% (from 2,950 in 2019 to 1,990 in 2020). The remainder of 24% of new diagnoses were among people who had had their initial HIV diagnosis abroad.

Among gay and bisexual men, the number of HIV diagnoses first made in England decreased by 41% from 1,500 in 2019 to 890 in 2020 (adjusted for missing probable route of exposure).

Taken together with only small declines in testing and a continuing availability of PrEP, the fall in diagnoses in gay and bisexual men suggests a continued year-on-year reduction in transmission in this group. These declines in diagnoses were less apparent among gay and bisexual men who were living outside London, those of Black, Asian, Mixed or Other ethnicity ethnic groups, and those born abroad.

The overall reduction in transmission among gay and bisexual men is supported by a CD4 back-calculation model that suggests a decline in new infections of 38% from 400 (95% CrI 240 to 800) in 2019 to 250 (95% CrI 110 to 710) in 2020 equivalent to less than 1 per 1,000 gay and bisexual men in England.

In 2020, 1,010 people who probably acquired HIV through heterosexual contact were first diagnosed with HIV in England (after adjusting for missing exposure information), a 23% decrease from 1,320 in 2019. The decline was 40% among White heterosexuals (from 470 in 2019 to 280 in 2020) and 40% among Black Caribbean heterosexuals (from 50 to 30) but less

pronounced among Black Africans (25%, 400 to 300) and among Asians (17%, 60 to 50). Among heterosexual men and women born abroad but diagnosed with HIV in England, 49% were estimated to have acquired HIV after arrival in England.

Since there has been a very large decline in HIV testing among heterosexuals in 2020 compared to previous years, it is likely that much of the observed decline in diagnoses in this group was due to reduced testing rather than evidence of reduced transmission.

## Late HIV diagnoses and deaths

In 2020, 42% (640 out of 1,540) of people first diagnosed in England were diagnosed late in 2020, an increase from 35% (1,040 out of 2,930) in 2016 and 40% (850 out of 2,100) in 2019, although the number of people diagnosed late continued to fall. Rates of late diagnosis were highest in heterosexual men and women at 55% and 51% respectively, compared with 29% in gay and bisexual men. People diagnosed late in 2019 had more than a 7-fold increased risk of death within a year of diagnosis compared with those diagnosed promptly.

In 2020, there were 614 deaths among people with HIV. At least 99 deaths were due to COVID-19 between March and June 2020. After adjusting for age, the risk of death from COVID-19 among people with HIV was low, but twice as high as the general population. Almost all deaths occurred in people with co-morbidities associated with COVID-19 morbidity; the vaccine programme and social distancing measures will likely have reduced the risk of severe COVID-19 infection among people with HIV.

## UNAIDS 95-95-95 targets and transmissible levels of virus

The quality of care received by people living with HIV remained high. For the first time, the UNAIDS 95-95-95 targets were met with 95% of all people diagnosed, 99% of those in care on treatment and 97% of those receiving treatment being virally suppressed in both the UK and England. These means that 91% of all people living with HIV in care were virally suppressed surpassing the 73% UNAIDS 90-90-90 target as well as the 86% UNAIDS 95-95-95 target.

Nevertheless, in England, 9% (8,790) of people had transmissible levels of virus, the converse of the substantive 91% UNAIDS 90-90-90 targets for 2020. This figure rises to 16% (16,040) when those not linked to care (290) and not retained in care (6,960) are included. If individuals for whom viral load data were missing in 2020 were all categorised as having transmissible virus, 20% (19,800) of people living with HIV may have transmissible levels of HIV in 2020.

## Pre-Exposure Prophylaxis (PrEP)

From October 2017 to July 2020, over 24,000 people had access to PrEP in England through the Impact Trial, most of whom were gay and bisexual men (96%).

Data up to February 2020 showed that participants were more likely to be White (76%) and aged 25 to 39 years (median age 33 years), with just under 3% identifying as women and 1.5% as Black African. Routine PrEP availability began in the autumn of 2020 through specialist SHS. Community surveys indicate that a minority of gay and bisexual men stopped taking PrEP because of reduced sexual activities during COVID-19 social restrictions.

## HIV Action Plan

The HIV Action Plan for England aims to reduce HIV transmission, AIDS- and HIV-related deaths as well as reducing HIV-related stigma. To achieve these aims, a combination prevention approach will be implemented focussing on prevent, test, treat and retain. It will be followed by a monitoring and evaluation framework in 2022, where progress made towards the ambition, will be monitored at national, regional and local levels.

# Introduction

This annual report reviews data for 2020 on HIV testing, Pre-Exposure Prophylaxis (PrEP), new HIV diagnoses and the care outcomes for people accessing HIV services. It is accompanied by [4 sets of data tables and 2 slide set presentations](#). The focus of the report is on England to coincide with the release of the English HIV Action Plan. This year, there were considerable challenges due to staff redeployment during the COVID-19 pandemic. Consequently, data for Scotland is not available for 2020, and only summary data for the United Kingdom is presented. All numbers presented were rounded to the nearest 10, except for rates and deaths.

## Impact of the COVID-19 pandemic

In response to the COVID-19 pandemic, the UK government enforced strict national and regional lockdowns from March 2020 onwards and encouraged people to stay at home and practice social distancing. People living with diagnosed HIV with advanced infection were advised to self-isolate ([1](#)) and many consultations for HIV care shifted from face-to-face to telephone appointments. The COVID-19 social restrictions affected sexual behaviour, patient interaction with sexual health services (SHS) and HIV outpatient care, and how services delivered their care.

## Sexual behaviours

A UK survey found gay and bisexual men reported fewer sexual partners during the lockdowns ([2](#)) and reduced physical sexual activities ([3](#)) although condomless sex and chemsex among some groups continued during lockdowns ([4](#)). These changes in sexual behaviours reverted back to 2017 levels (and sometimes higher) in the second part of 2020 ([5](#)).

In the Natsal-COVID survey of adults living in the UK, most sexually-active participants reported declines in the frequency of physical sexual activities during lockdown (from 23 March 2020 to survey fielding between 29 July and 10 August 2020) compared with the 3-month period before lockdown ([6](#)).

## HIV testing behaviour

An overall drop in HIV testing was observed across all SHS between 2019 and 2020. The decrease was particularly apparent for face-to-face services, but partially compensated for by an increase in testing via internet-based services compared with previous years (further information in the HIV testing section below) ([7](#)).

## Service delivery

From March 2020, healthcare services, including SHS in the UK, restricted access to face-to-face consultations to urgent and complex cases. While restrictions relaxed from June onwards, there was still a shift in delivery from face-to-face to virtual consultations.

In a provisional in-year analysis of 134 out of 164 HIV outpatient sites ([8](#)), the overall number of consultations between April to July 2020 was lower than for the same period in 2019 ([Figure 1](#)), with steepest declines observed in virologically-stable patients and patients with comorbidities ([8](#), [9](#)). Face-to-face consultations decreased by 32% between 2019 and 2020 with telephone consultations increasing over 7-fold from 7,910 to 59,280 ([Figure 1](#)). Telephone consultations were likely higher than that reported due to difficulties in reporting these details during the period ([10](#)).

Using the finalised, complete data set, we are able to assess how many people were not retained in HIV care between 2019 and 2020. Based on the previous year-on-year percentage increase in patients seen for HIV care, it was anticipated that 93,800 people would have accessed HIV care in 2020. Reports were received from 88,800 in 2020 (77% face to face compared with 96% in 2019).

Furthermore, an estimated 6,960 people with diagnosed HIV infection who were seen for care in 2019 did not attend for care during 2020 (virtually or face to face); this measure called retention in care was almost double the equivalent measure reported in 2019 (3,600).

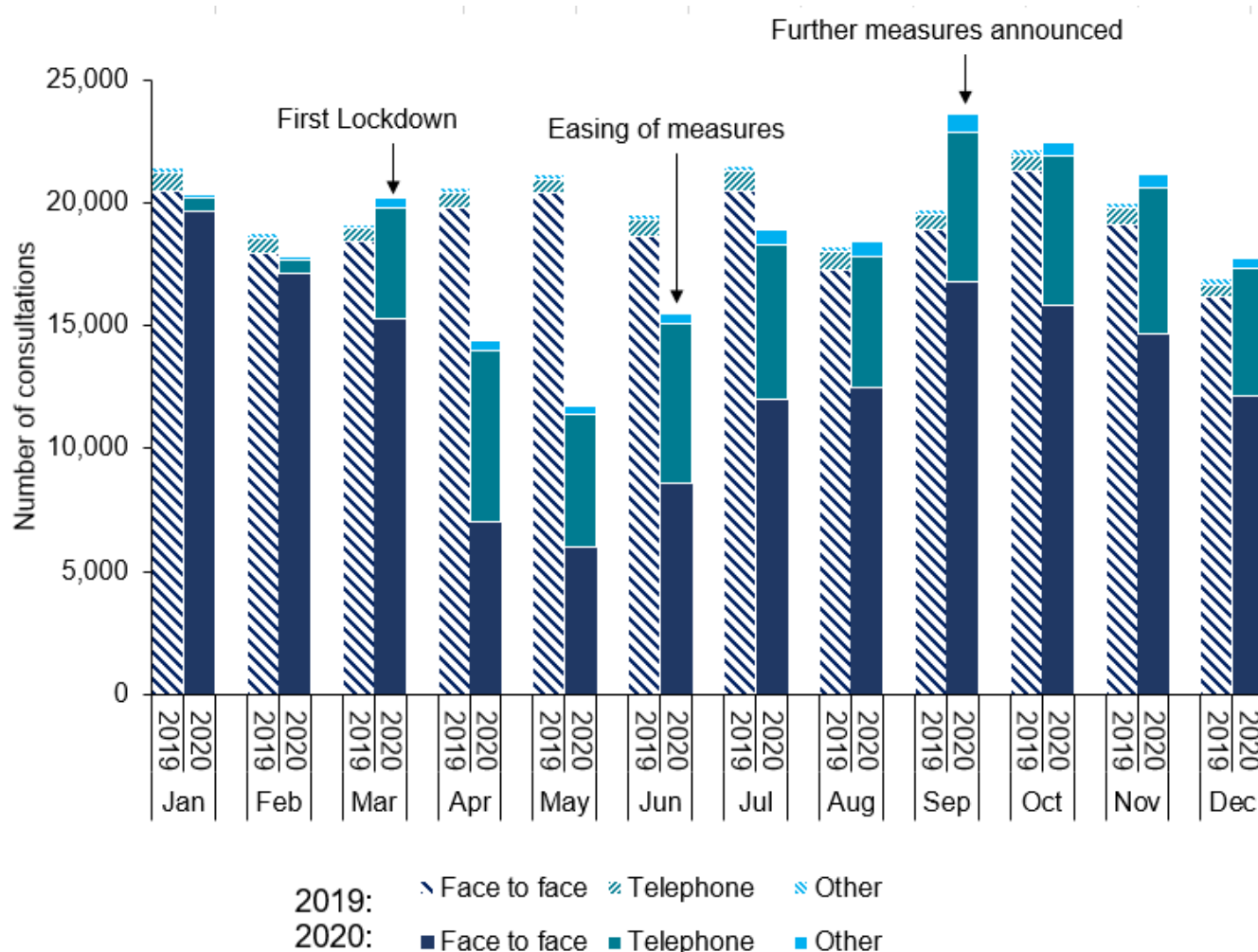
In 2020, the number of patients with reports of CD4 cell counts and viral load tests were lower than 2019, by 19% and 11%, respectively, with fewer reports during the period of April to July 2020.

## COVID-19 outcomes

The study of the British HIV Association (BHIVA) registry of COVID-19 cases in people living with HIV concluded that people with HIV with co-morbidities such as obesity, diabetes, cardiovascular disease, a current AIDS-defining illness or a CD4 count less than 200 cells/mm<sup>3</sup>, were more at risk of severe COVID-19 outcomes compared to the general population ([11](#)).

Furthermore, a retrospective study of individuals living with HIV in the UK, who were hospitalised with COVID-19 infection in the first pandemic wave in 6 sites found that people with HIV were at no higher risk of requiring mechanical ventilation compared with the general population, when severity at admission, frailty and other chronic conditions were taken into account ([12](#)).



**Figure 1. Provisional in-year analyses of the number of HIV consultations in 134 sites with complete data for both years by consultation medium: England, 2019 to 2020**

In addition, 3 studies, the UK study using OpenSAFELY ([13](#)), the ISARIC WHO CCP-UK study ([14](#)), and the UKHSA study on people with HIV in England ([15](#)), all concluded that while crude mortality rates were low, people living with HIV were twice as likely to die from COVID-19 infection compared with the rest of the population during the first wave of the pandemic in 2020, echoing reports in other countries ([16](#)). Two of these studies reported that the increased risk was only seen in people living with HIV who also had other chronic health conditions, such as cardiovascular disease or diabetes ([15](#)).

## Data quality and interpretation

The COVID-19 pandemic measures resulted in increased workloads and redeployment of staff; this had a major impact on the ability of HIV services to collect high quality data. This led to reporting delays and incomplete data sets, making the epidemiological situation in 2020 difficult to interpret. In mitigation, novel statistical and modelling techniques have been applied to investigate trends in HIV incidence and undiagnosed prevalence ([Appendix 1](#)). However, these adjustments and sensitivity analyses are preliminary and further development of these models

to fully understand and account for the impact of the COVID-19 pandemic on the HIV epidemic are ongoing.

## National progress towards ending HIV transmission

### HIV testing in England

#### HIV testing in Sexual Health Services

Between 2019 and 2020, the number of people who tested for HIV in any SHS ([17](#)) fell by 30% from 1,320,510 to 927,760, a reversal in the year-on-year increase observed over the decade. Over half (51%) of people tested for HIV in 2020 used specialist SHS, 46%, internet-based SHS and 3%, other non-specialist SHS ([Figure 2](#)).

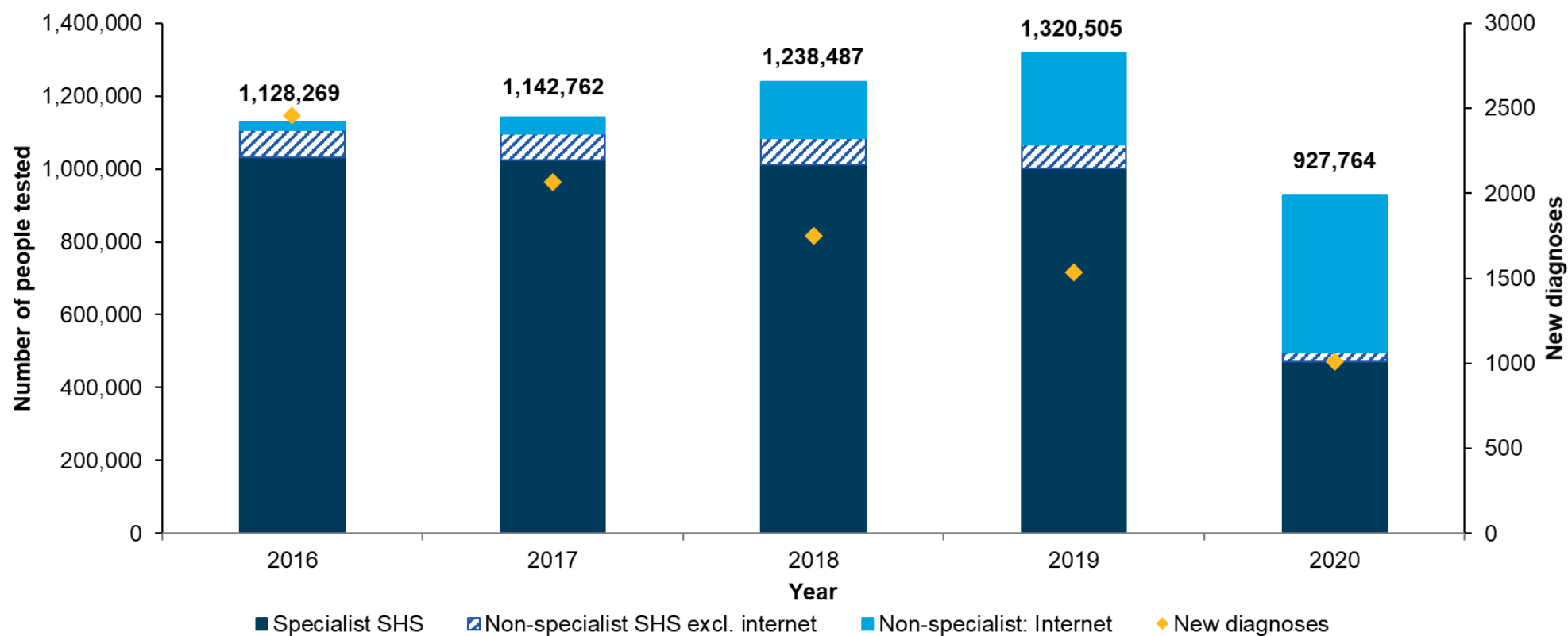
The number of people who tested at specialist SHS fell by 53% from 1,001,140 in 2019 to 471,230 in 2020, compared with a 3% rise between 2016 and 2019. In contrast, a 70% increase was observed among those testing via internet-based services from 254,260 in 2019 to 432,220 in 2020, after already rising by 64% between 2018 and 2019.

The testing coverage, or proportion of people tested for HIV among eligible attendees (excluding appointments for reproductive health purposes), was 46% in specialist SHS in 2020 (471,230 out of 1,023,370), a fall from 65% in 2019 ([Figure 3](#)). The proportion of eligible attendees reported as not being offered tests rose from 16% in 2019 to 38% in 2020; this is likely to be a consequence of the shift from face-to-face to virtual consultations, but also because of the inconsistency of coding for reproductive health purposes. Of the 552,140 people not tested for HIV, 71% were not offered a test and the remaining 29% declined a test.

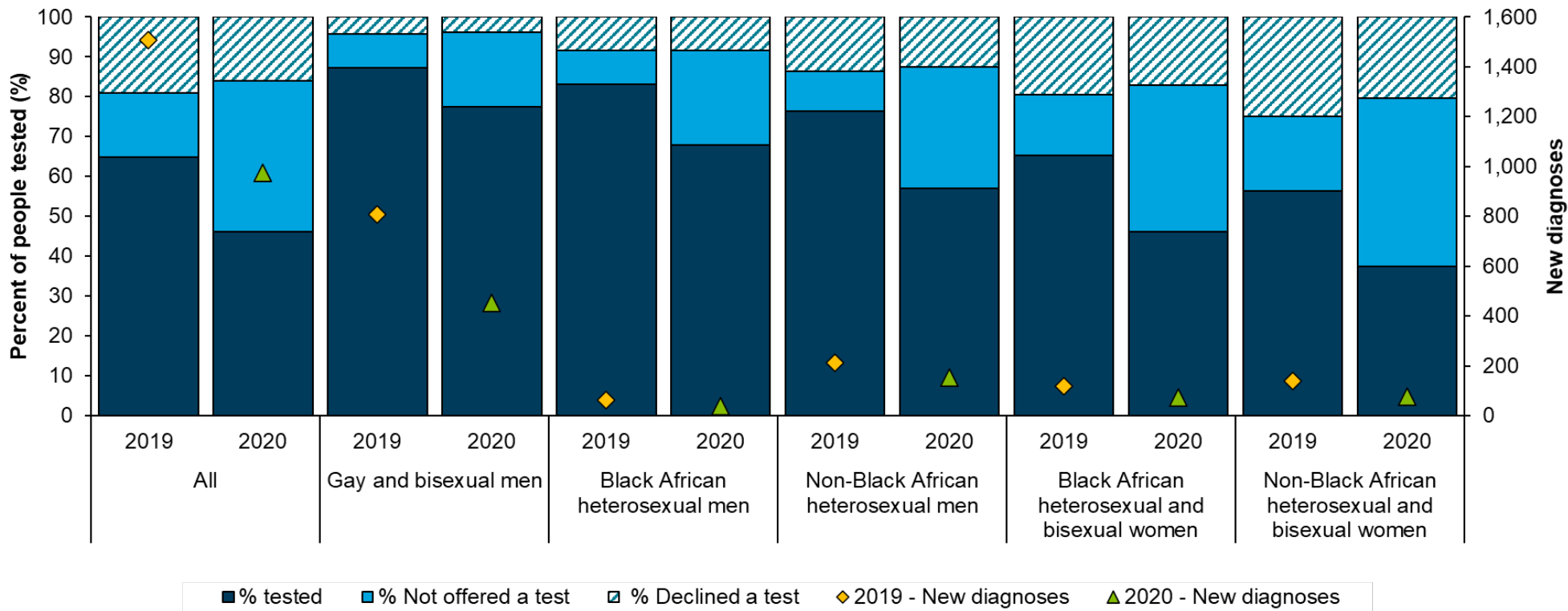
The proportion of women having an HIV test via internet-based SHS was slightly higher compared with men (57% versus 53%). The proportions were also higher among those under 35 years of age compared with those aged 35 years and over (79% versus 75%).

The decrease observed in HIV testing in all SHS further contributed to a decrease in new HIV diagnoses made in SHS. The annual number of new HIV diagnoses reported through SHS decreased by between 12 and 16% each year between 2016 and 2019, but fell by 34% from 1,530 in 2019 to 1,010 in 2020 ([Figure 2](#)). The proportion of people who tested positive for HIV at SHS was 0.1 % in 2020 similar to 2019.

**Figure 2. Number of attendees tested for HIV and new diagnoses at all SHS by SHS type: England, 2016 to 2020**



**Figure 3. Testing offer and uptake at specialist SHS among eligible attendees by ethnicity and sexual orientation: England, 2019 and 2020**



## HIV testing outside sexual health services

### Partner notification

HIV partner notification is a process by which contacts of people living with HIV, either newly diagnosed or with a detectable viral load, are identified and offered HIV testing ([18](#), [19](#)). In 2020, 940 people attended SHS as a result of partner notification; a decrease of 44% compared with 1,710 in 2019. Of the contacts in 2020, 75% (710) were tested on the day of their attendance and 50 new HIV diagnoses were made (7% tested positive).

### Universal screening

HIV testing coverage for pregnant women in antenatal care remained high (more than 99%) and 661,250 women were tested in the 2019 to 2020 financial year ([20](#)). The proportion of women who screened positive for HIV during pregnancy remained low at 11.9 per 100,000 eligible pregnant women (0.12%). The vast majority of these women would have already been diagnosed with HIV before pregnancy. In 2020, under 5 infants born from HIV positive mothers were diagnosed with HIV in England.

In 2020, over 1.7 million blood donations were screened across the UK, with 9 new donors screening positive for HIV (0.5 per 100,000 donations), and one repeat donor who acquired HIV in the last year ([21](#)).

### TB testing

In 2020, 97% (3,630 out of 3,730) of notified TB cases in England, with previously unknown HIV status and where testing information was available, were offered an HIV test. Of these, the uptake rate was 97% resulting in 3,540 tested in this setting.

### General practice, emergency departments and in- and out-patient secondary care

In line with national guidelines ([22](#), [23](#)), HIV testing should be expanded outside of SHS in extremely high ( $\geq 5$  per 1,000 people, aged 15 to 59 years with diagnosed HIV) and high diagnosed HIV prevalence settings ( $\geq 2$  and  $< 5$  per 1,000 people, aged 15 to 59 years with diagnosed HIV). A list of local authorities with diagnosed HIV prevalence within these ranges is given in [Appendix 2](#).

In 2020, 17 laboratories reported HIV testing data from general practice (GP) and hospitals to the Sentinel Surveillance of Blood Borne Viruses (SSBBV) ([24](#)). A total of 50,100 people tested at a GP in 2020 (91,630 in 2019), 144,190 in secondary care (202,160 in 2019) and 68,560 in emergency departments (79,550 in 2019) were reported through SSBBV, with 0.3%, 0.4%, and 0.6%, testing positive respectively.

Testing rates dropped in 2020 with the steepest decreases in areas of extremely high HIV prevalence in GP and secondary care but increased in emergency departments. The highest proportion testing positive were reported in areas of extremely high prevalence, compared with areas of low ( $< 2$  per 1,000 people, aged 15 to 59 years with diagnosed HIV) or high HIV prevalence. In emergency departments, for example, the proportion testing positive was 0.6% in

areas of very high HIV prevalence compared with 0.4% in areas of low and high HIV prevalence ([Figure 4](#); see list of areas in [Appendix 2](#)).

### Prisons

In March 2018, opt-out testing of blood-borne viruses, including HIV, was implemented in all adult prisons in England. New arrivals and people transferring between prisons should now be offered HIV tests, unless they have been tested within the last year and are not at risk, or they have a known HIV positive status ([25](#)). Between April 2020 and March 2021, 86% of people in the justice system were offered HIV testing within 7 days of reception (121,400 out of 140,800). Among those who were eligible, 49% were tested (49,900 out of 102,200).

### People who inject drugs

The Unlinked Anonymous Monitoring (UAM) Survey of People Who Inject Drugs (PWID) ([26](#)) is an annual cross-sectional biobehavioural survey that recruits people who have ever injected psychoactive drugs through specialist drug and alcohol agencies across England, Wales and Northern Ireland. The services provided by these agencies changed with a reduction of face-to-face contact as a result of the COVID-19 pandemic. Consequently, recruitment to the UAM Survey in 2020 was limited and the 2020 data is considered preliminary ([27](#)).

Among PWID recruited in England, HIV prevalence remained relatively stable and low over the past decade from 1.3% (95% confidence interval (95% CI) 0.88% to 1.8%) in 2011 to 1.2% (95% CI 0.44% to 2.6%) in 2020. The proportion who reported ever having a diagnostic HIV test has remained stable during this period, from 78% (95% CI 76% to 79%) in 2011 to 80% (95% CI 77% to 82%) in 2020. The proportion reporting an HIV test in the current or previous year has also plateaued and was 35% (95% CI 33% to 37%) in 2011 and 33% (95% CI 30% to 36%) in 2020. In 2020, all PWID who participated in the survey in England who had antibodies to HIV, were aware of their HIV status (100%, 6 out of 6).

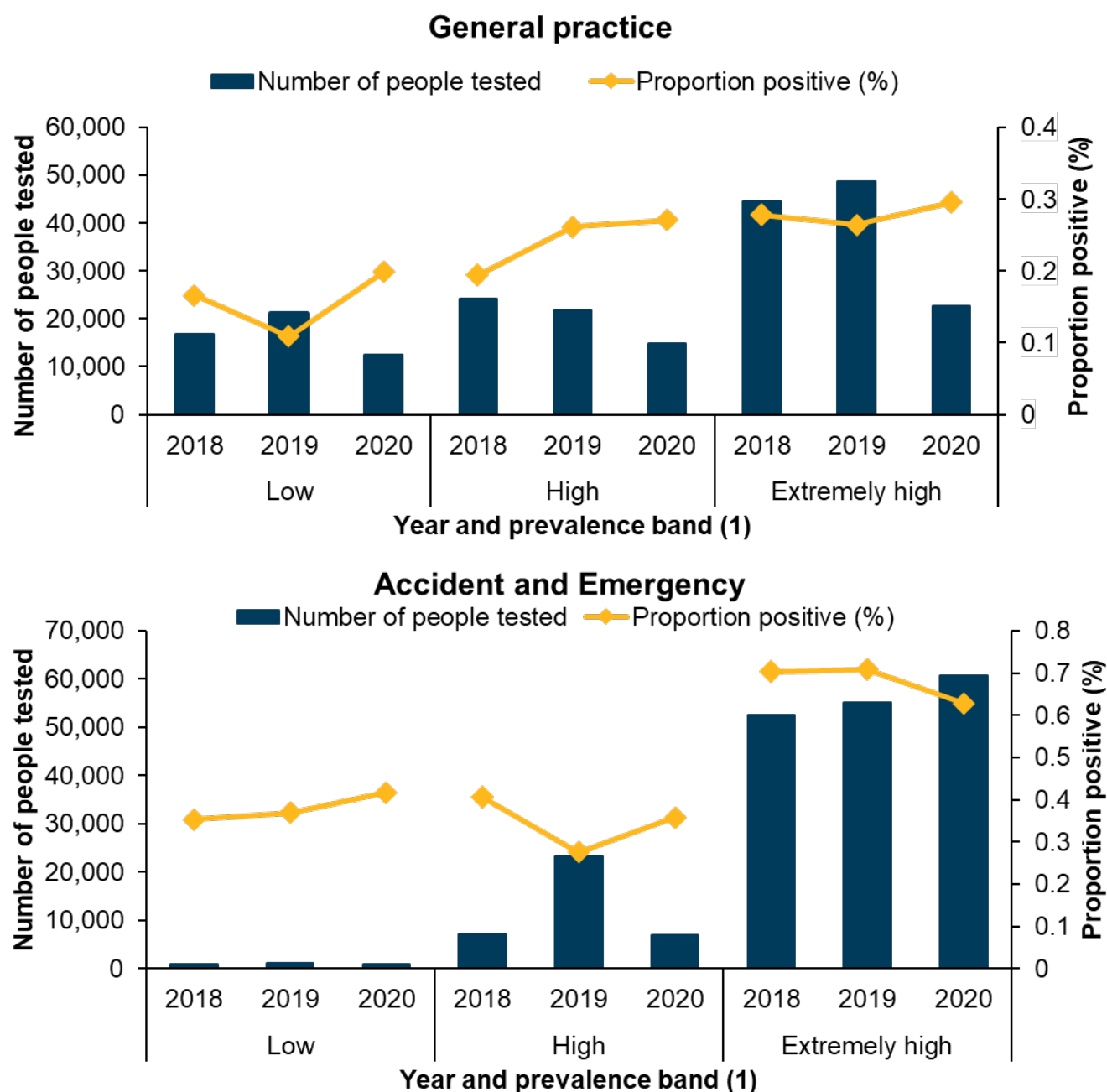
Many PWID who reported never having had an HIV test or not having been tested in the last 2 years have attended a range of clinical services, suggesting missed opportunities for HIV testing and prompt diagnosis ([Figure 5](#)).

### Home and community

In 2020, there were 21,060 self-sampling test kits returned via the national HIV self-sampling scheme, a reduction of 18% compared with 25,510 in 2019, with a test reactivity rate of 0.6% ([28](#)).

Another 10,780 tests were reported through the PHE/UKHSA Survey of HIV Testing in Community Settings in 2020 ([29](#)), compared with 35,100 tests in 2019. Pandemic pressures affected the survey response rate, with 16 out of 36 (44%) services responding with 2020 data, compared with 26 out of 41 (63%) for 2019 data. Overall, the reactivity rate in community testing services was 0.3%.

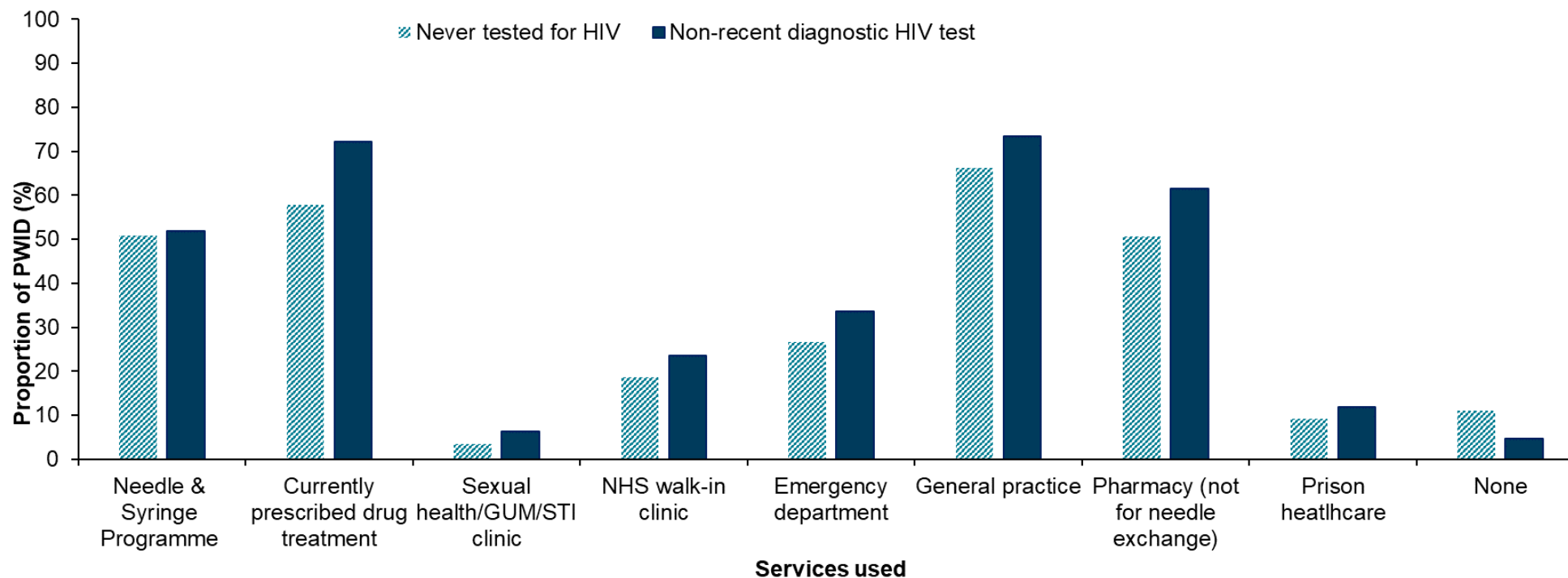
**Figure 4. Number of people tested and proportion of positive tests by setting, year and HIV prevalence band (1), data from Sentinel Surveillance of Blood Borne Viruses: England, 2018 to 2020**



(1) Diagnosed HIV prevalence bands are based on the number of people diagnosed with HIV and accessing care at HIV outpatient clinics in a given year. They are expressed per 1,000 residents aged 15 to 59 years. Low diagnosed HIV prevalence ( $<2$  in 1,000), high ( $\geq 2$  and  $<5$  in 1,000), extremely high ( $\geq 5$  in 1,000).



**Figure 5. Self-reported access to health services in the previous year among PWID who reported never having had a diagnostic HIV test and those who reported not testing recently (over 2 years since last test or year of last test unknown): England, 2020**



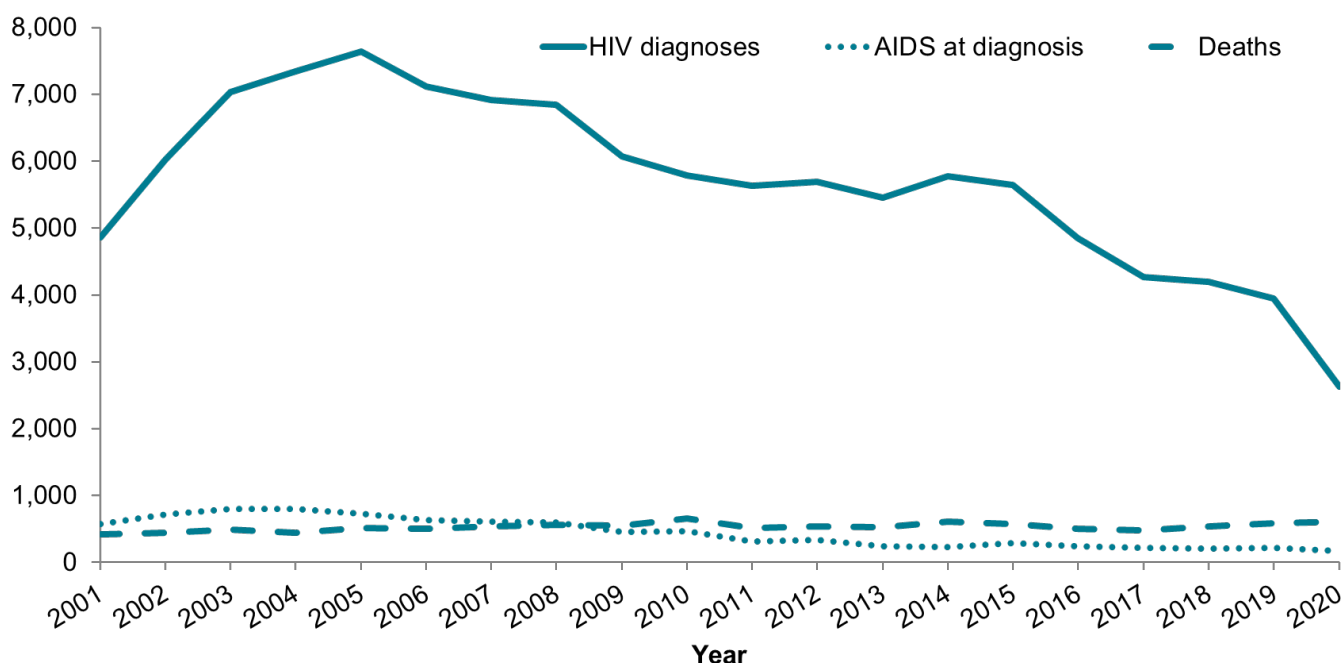


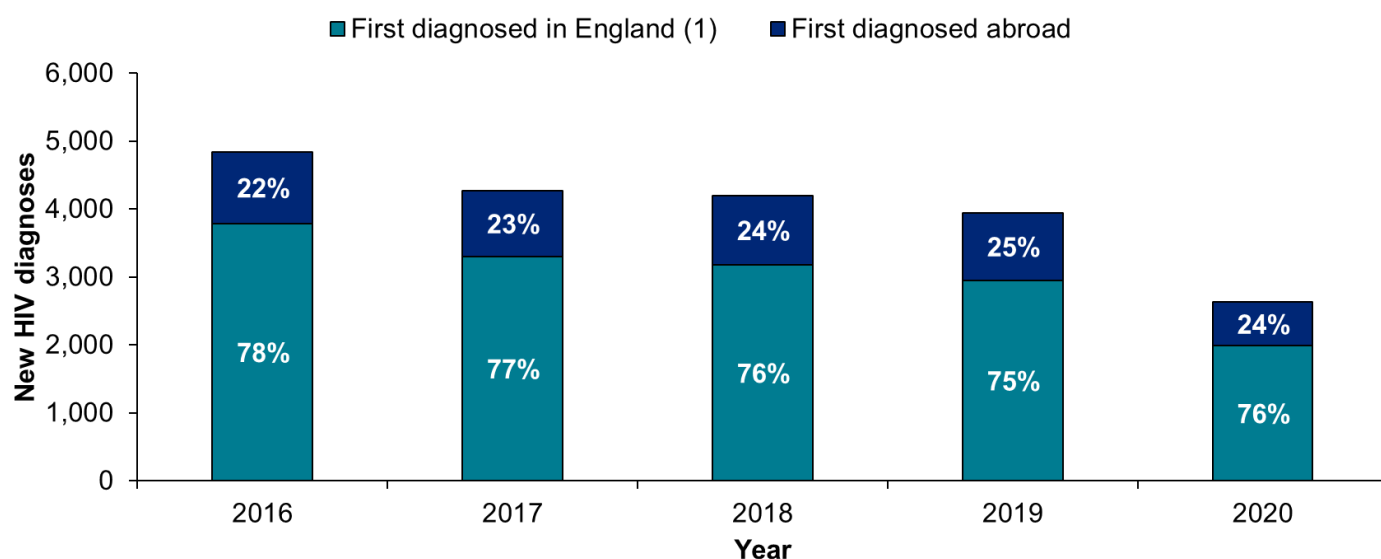
## New HIV diagnoses

There were 2,780 people newly diagnosed with HIV in the UK in 2020, of whom about three-quarters (76%, 2,110) were first diagnosed in the UK (data does not include Scotland). In England, the equivalent figure was 2,630 (770 women, 1,860 men); a 33% fall from 3,950 in 2019 and a 54% fall from 5,780 new diagnoses reported in 2014 ([Figure 6](#)).

In England, of the 2,630 new HIV diagnoses in 2020, about three-quarters (76%, 1,990) were first diagnosed in England with the remaining (24%, 640) previously diagnosed abroad. The number of persons previously diagnosed abroad remained fairly steady across all exposure groups, and at around 1,000 new diagnoses overall each year between 2016 and 2019 ([Figure 7](#)). The number of HIV diagnoses first made in England fell from 3,790 in 2016 to 2,950 in 2019 and 1,990 in 2020. Gay and bisexual men comprised 45% of all diagnoses first diagnosed in England in 2020; heterosexual women, 26%; heterosexual men, 24%; and PWID, 3% (adjusted for missing information). Of 24 people diagnosed in 2020 acquired HIV through vertical transmission, under 5 were born in the UK. In 2020, no transgender people were newly diagnosed with HIV in England (under 5 non-binary and other gender diverse people), this compares to under 10 in 2019.

**Figure 6. New HIV diagnoses, AIDS at diagnosis, and all-cause deaths in people with HIV: England, 2001 to 2020**



**Figure 7. New HIV diagnoses by location of first diagnosis: England, 2016 to 2020**

(1) Less than 0.5% of new HIV diagnoses were first diagnosed in the UK outside England.

## Late HIV diagnoses

This year, the late HIV diagnosis surveillance definition of a CD4 count less than 350 cells/mm<sup>3</sup> within 91 days of diagnosis was reviewed to better account for the 'seroconversion effect' or a transient decline in CD4 cell count which may occur in people with recently acquired HIV infection (30, 31) (see [Appendix 1](#)). Mis-classification of recent infection as late diagnoses is particularly likely among groups who test frequently for HIV. As a result, a proportion of late diagnoses, identified by the current definition, was reclassified as not late.

To improve accuracy, a correction for recent seroconversion was applied in 2020 and retrospectively to the national data.

In 2020, of 790 people first diagnosed in the UK with a CD4 less than 350 cells/mm<sup>3</sup>, 120 were reclassified as 'not late' due to evidence of recent seroconversion (see [Appendix 1](#)). After correction, a total of 670 new diagnoses were made at a late stage of infection in the UK in 2020, equivalent to 42%. Equivalent figures for England were 760 diagnoses, 110 reclassifications and 640 late diagnoses (42%).

A comparison of the 2 methods of classification is provided for England in [Figure 8](#).

The number of people diagnosed late (corrected for recent seroconversion) decreased by 78% from 3,000 in 2005 to 640 in 2020. In 2020, 55% and 51% of heterosexual men and women, respectively, were diagnosed at a late stage compared to 29% among gay and bisexual men

([Figure 8](#)). Between 2016 and 2020, the decline in the number of late diagnoses was steepest among gay and bisexual men (57% decline, from 380 to 160) followed by Black African heterosexual men (52% decline, from 104 to 50) and White heterosexual men (43% decline, from 129 to 73). Declines were also observed for White heterosexual women (40% decline, from 70 to 40) and for Black African heterosexual women (29%, from 120 to 90).

The one-year mortality rate was 31 per 1,000 among those diagnosed late in 2019 compared with 4 per 1,000 among those diagnosed promptly. The impact of late HIV diagnosis on one-year mortality was particularly marked among people aged 65 years and over, at 59 per 1,000, and among people whose probable route of exposure was injecting drug use, at 63 per 1,000.

## All-cause and AIDS-related mortality

The total number of deaths due to all causes among people with HIV in England has remained stable over the last decade, with 614 deaths (467 men and 147 women) in 2020 (634 overall deaths in the UK not including Scotland; 482 men and 152 women) ([Figure 6](#)). This represents a crude mortality rate of 630 per 100,000 population living with diagnosed HIV infection in England in 2020 (compared with 631 per 100,000 in 2019).

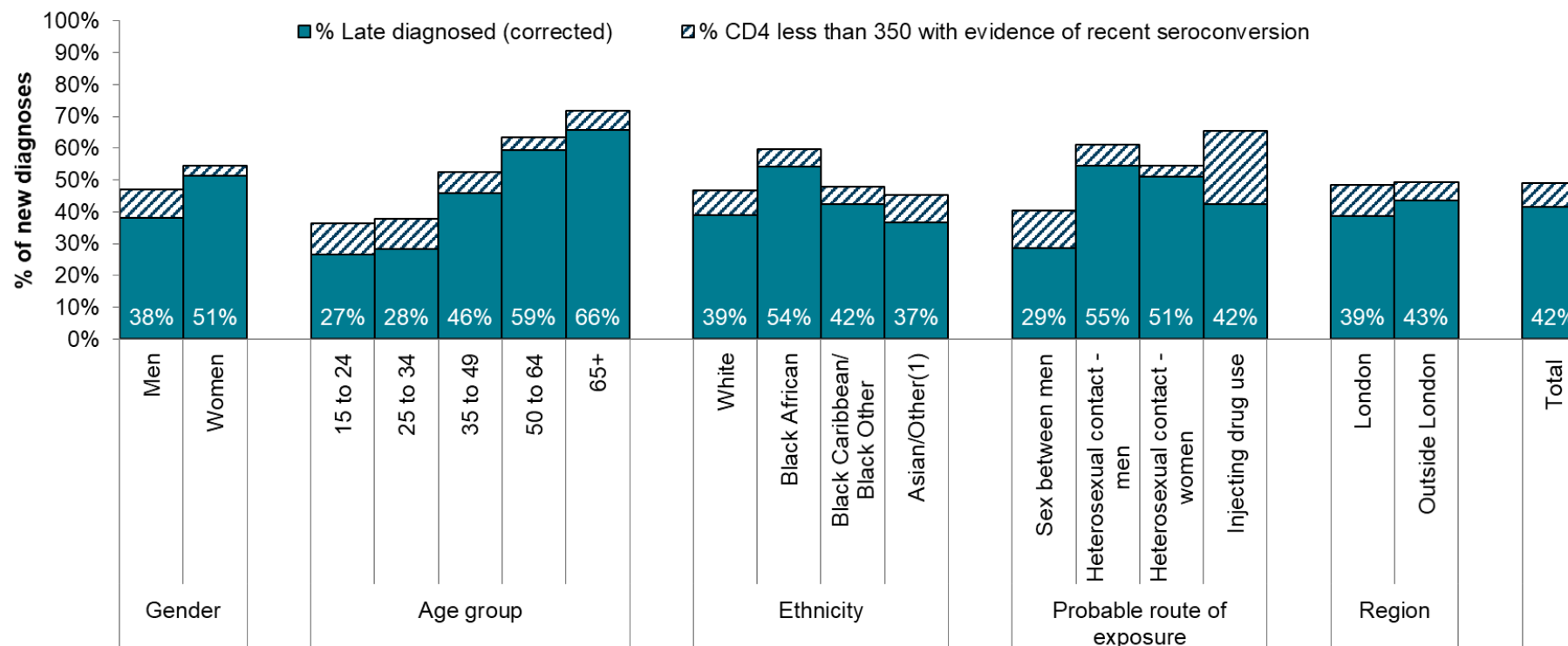
Approximately half of deaths in England among people with HIV are thought to be HIV related ([32](#)). Of the 614 deaths reported in 2020, 4 had an AIDS-related illness as the cause of death, 16 had an AIDS-related illness reported within a year of death, and 28 had a late diagnosis (with a CD4 cell count less than 350 cells/mm<sup>3</sup>) within a year of death.

Work is currently ongoing to develop consensus surveillance definitions for HIV-related and HIV-preventable deaths in collaboration with the main stakeholders (including BHIVA, European AIDS Clinical Society, Fast-track Cities London and European AIDS Treatment Group) ([33](#)).

## UNAIDS targets

Achieving all 3 UNAIDS 90-90-90 targets results in 73% of people living with HIV having an undetectable viral load ([Figure 9](#)). People living with HIV who maintain an undetectable viral load cannot pass on the virus to sexual partners ([34](#)), known as Undetectable = Untransmissible (U = U). If the UNAIDS 90-90-90 targets were met exactly, a corresponding 27% would have transmissible levels of virus. The equivalent figure for the UNAIDS 95-95-95 targets is 14%.

**Figure 8. Proportion of people diagnosed with a CD4 count less than 350 cells/mm<sup>3</sup> (with or without evidence of recent seroconversion) by gender, age group, ethnicity, probable route of exposure and region: England, 2020**

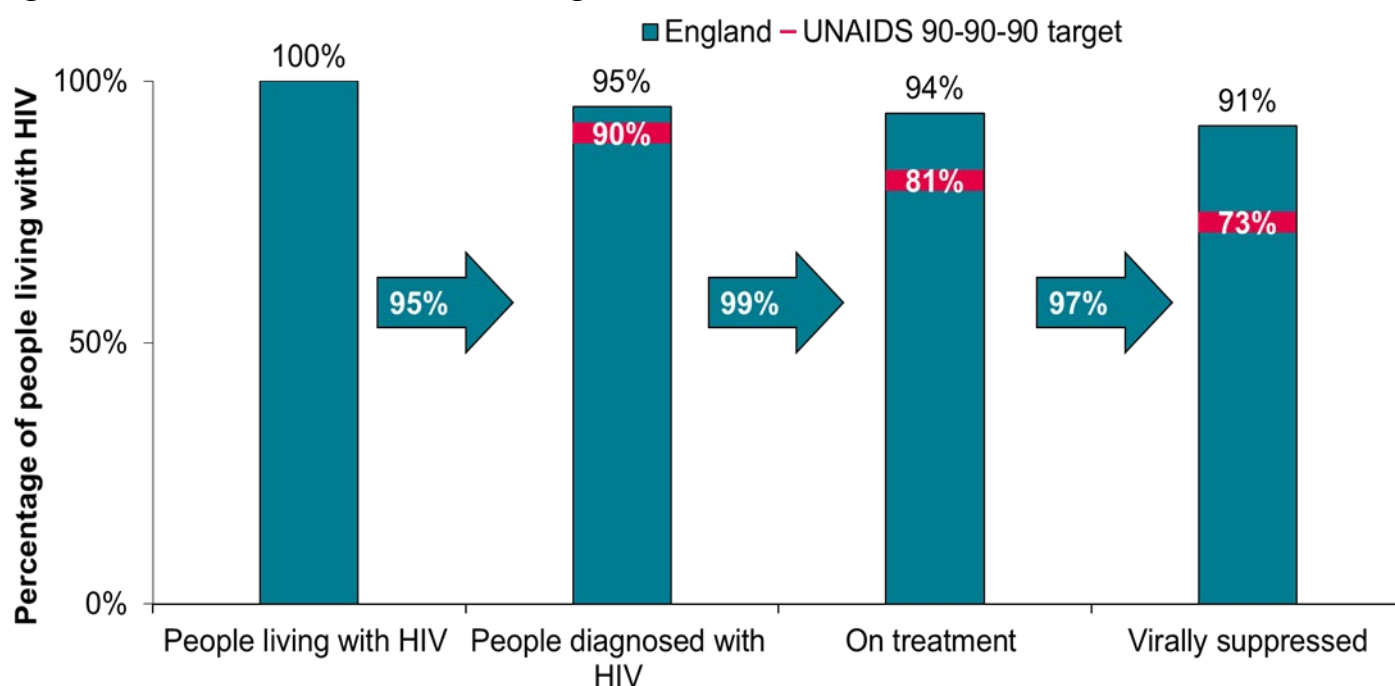


(1) Asian or Other includes Asian, mixed and other minority ethnic groups.

In 2020, the total number of people living with HIV infection (diagnosed and undiagnosed) was estimated using the Multi-Parameter Evidence Synthesis (MPES) statistical model fitted to census, surveillance and survey-type prevalence data (see [Appendix 1](#)) (35, 36). These estimates show that, in 2020, the UNAIDS 90-90-90 targets were met among the 106,890 (95% credible interval (CrI) 105,460 to 109,510) people living with HIV in the UK and the 97,740 (95% CrI 96,400 to 100,060) in England, with 95% of people living with HIV being diagnosed, 99% of those diagnosed being on treatment and 97% of those on treatment having an undetectable viral load ([Figure 9](#)). In London, the equivalent figures were 96%, 98% and 97%, exceeding the 2030 95-95-95 UNAIDS targets for the third consecutive year.

In the UK, an estimated 5,150 (95% CrI 4,000 to 7,770) were undiagnosed in 2020, equivalent to 5% (95% CrI 4 to 7%) of those living with HIV. Data from 2019 was used for Scotland. Equivalent estimates for England were 4,660 (95% CrI 3,640 to 6,980) with an undiagnosed HIV infection in 2020, also equivalent to 5% (95% CrI 4 to 7%) of the total, a decrease compared to previous years, 5,560 (95% CrI 4,190 to 8,030) in 2019 and to 6,550 (95% CrI 4,790 to 9,700) in 2018. Nearly twice as many people with undiagnosed HIV infection in England lived outside of London, 3,000 (95% CrI 2,260 to 4,780) compared to 1,650 (95% CrI 1,200 to 2,470) in London.

**Figure 9. Continuum of HIV care in England, 2020**



## Number with transmissible viral load

In 2020, 9% (8,800) of the estimated 97,740 (95% CrI 96,400 to 100,060) people living with HIV in England had transmissible levels of virus, the converse of the substantive 91% UNAIDS 90-90-90 targets for England in 2020.

Additional analyses showed that up to 19,800 people living with HIV in England had transmissible levels of virus, equivalent to 20% of people living with HIV in England ([Figure 10](#)). Of these, an estimated 4,660 (95% CrI 3,640 to 6,980) (24%) were undiagnosed, 7,250 (37%) were diagnosed but not referred to specialist HIV care (also known as linked to care) or retained in care, 1,190 (6%) attended for care but were not receiving treatment, and 1,880 people (9%) were on treatment but not virally suppressed. The remaining 4,820 people (24%) had attended for care but were missing evidence of viral suppression ([Figure 10](#)).

In all of the above scenarios, the substantive UNAIDS 90-90-90 targets for 73% of all the population to be virally suppressed was met. Under the most realistic scenarios, the substantive 86% UNAIDS 95-95-95 targets was also met.

## Access to Pre-Exposure Prophylaxis (PrEP)

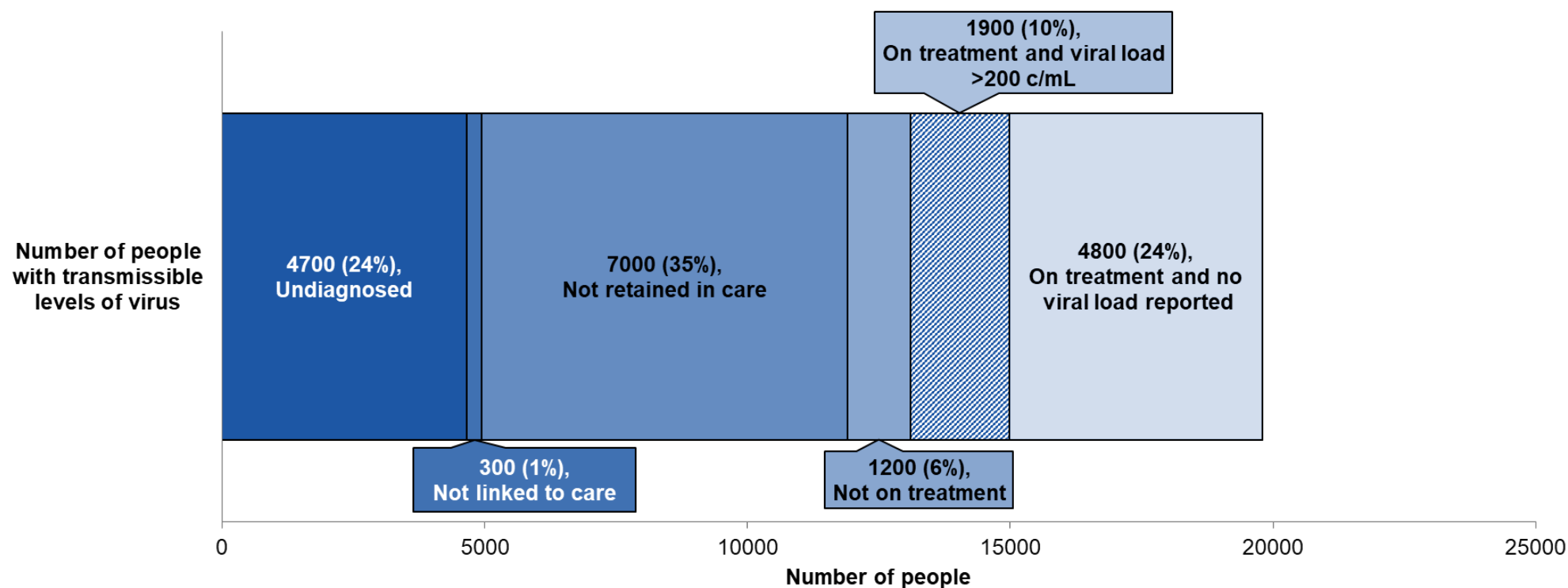
In England, PrEP was made available through the Impact trial, which recruited 24,255 participants between October 2017 and July 2020 ([37](#)). Participants enrolled up to February 2020 were more likely to identify as gay and bisexual men (96%), to be White (76%) and aged 25 to 39 years (median age 33 years). Just under 3% of the participants identified as women and 1.5% as Black African.

Since the autumn of 2020, oral PrEP, using a fixed dose combination of emtricitabine and tenofovir (F/TDF), has been available through routine commissioning at specialist SHS.

The 2020 UK PrEP User survey recruited 1,500 participants (86% gay and bisexual men, 85% White) from October to November 2020 ([38](#)). The most recent survey showed that among people using PrEP, 60% of respondents obtained PrEP from the Impact trial, 20% sourced PrEP from the internet and the remainder from Scottish and Welsh clinics, from other services, friends and other sources. This and another survey ([39](#)) indicate a decrease in the use of PrEP during social restrictions periods in 2020.

UKHSA has developed a national framework to monitor and evaluate the delivery of routinely commissioned PrEP in England. Aligned with the HIV Commission's ambition to end new HIV transmissions in England by 2030 ([40](#)), the framework includes a series of indicators to support the delivery of PrEP at a national, regional and local level. The indicators will be published within existing surveillance outputs starting in 2022.

**Figure 10. Estimated number (and proportion) among people living with HIV who had transmissible levels of virus, rounded to the nearest 100: England, 2020**



## Key populations

### Gay, bisexual and other men who have sex with men

We define gay and bisexual men to include any man who has reported having had sex with a man. Some men included in the gay and bisexual men will identify as having a different sexual identity.

#### HIV testing at sexual health services

In 2020, 146,900 gay, bisexual and other men who have sex with men tested for HIV at any SHS. This was a 7% decrease compared with the 157,710 men who tested in 2019, but higher than the 132,770 men who tested in 2018 ([Figure 11](#)). The proportion of men who tested via internet-based services, among those tested in all SHS, rose from 2% (21,020) in 2016 to 21% (254,260) in 2019, reaching 47% (432,220) in 2020. The proportion testing positive among gay and bisexual men who tested at SHS, continued to decline over the past 5 years from 1.2% in 2016 to 0.3% in 2020.

Over half (52%; 39,370 out of 75,680) of gay and bisexual men who tested at specialist SHS in 2020 had evidence of more than one test in the last year; this is likely due to be reflective of the requirement for regular HIV testing among PrEP users. The proportion testing positive among more frequent testers was considerably lower than among men who had not tested in the past 12 months (0.2% versus 1.1%).

In 2020, a total of 2,720 Black African gay and bisexual men tested at SHS. The proportion testing positive was higher in this group (1.1%) compared with White gay and bisexual men (0.3%).

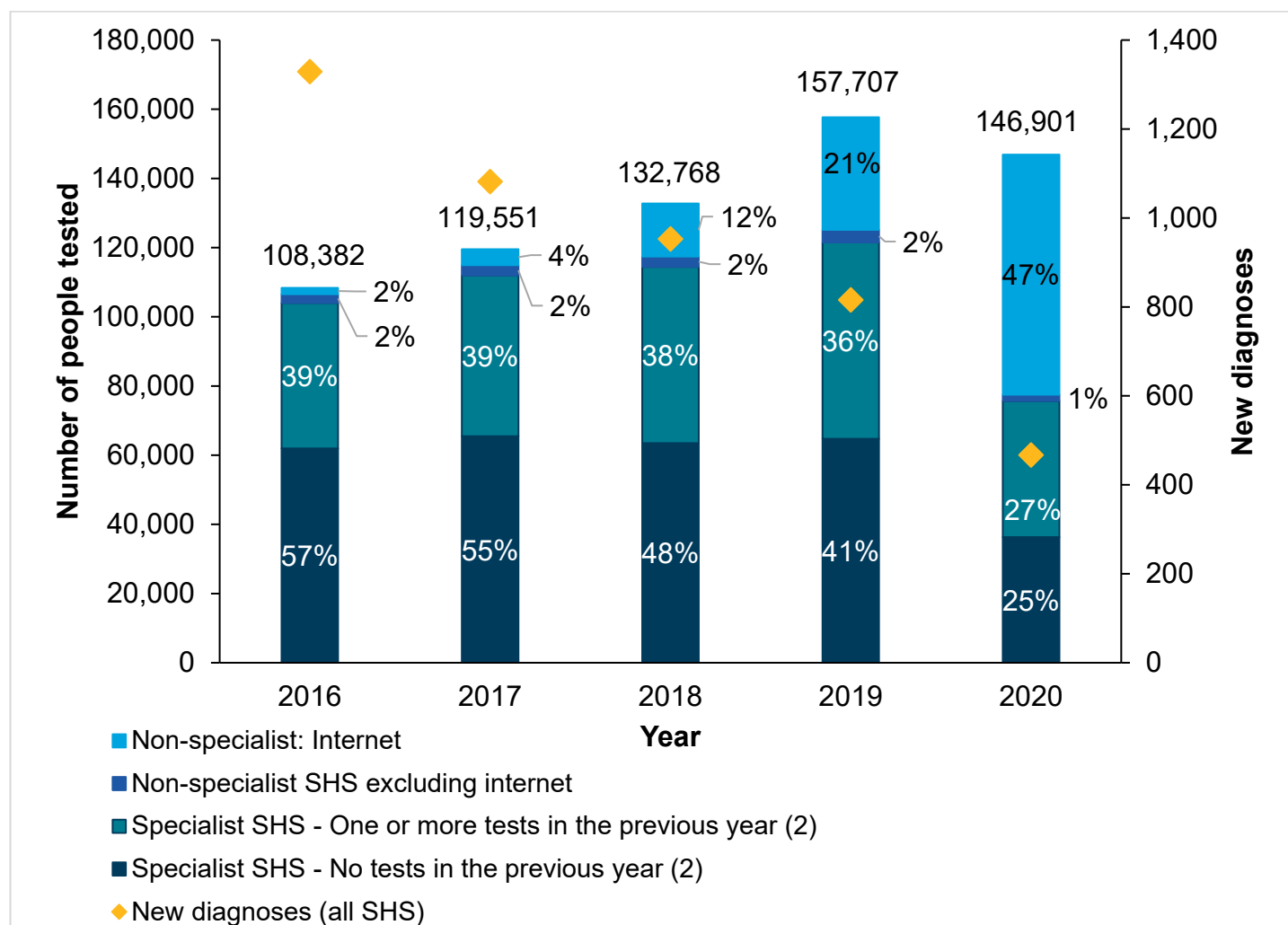
Among gay and bisexual men eligible for HIV testing, 23% did not have an HIV test (versus 13% in 2019). The equivalent figure among Black African gay and bisexual men was 21%. This decline is likely due to a shift to more telephone consultations at SHS.

#### New HIV diagnoses and incidence

In 2020, 940 gay and bisexual men were diagnosed with HIV in England (1,190 after adjusting for missing probable route of exposure). New diagnoses declined by 41% in 2020 from 2,000 in 2019 and by 63% from a peak of 3,200 in 2014 (adjusted for missing information).



**Figure 11. Number of people tested and new diagnoses among gay and bisexual men by service type and repeat testing (1) (for specialist SHS), England: 2016 to 2020**



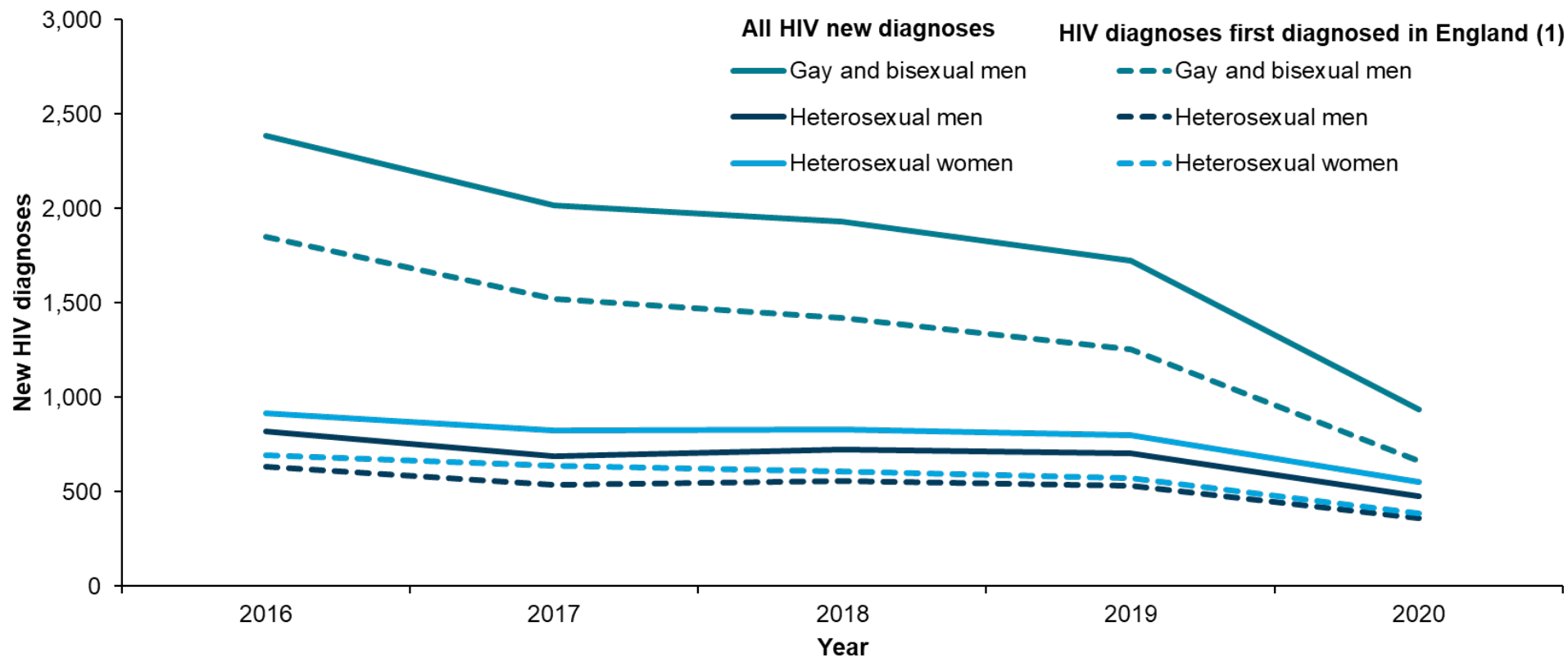
(1) Despite deduplication of patients attending the same clinic this may represent an overestimation of the true number of individuals tested. Some individuals may have attended multiple clinics or multiple internet-based services for HIV testing.

(2) Previous tests relative to the date last tested within the year of interest.

Almost three-quarters (72%; 860 out of 1,190) of new diagnoses among gay and bisexual men in 2020 were reported in SHS and, although this was a similar proportion compared to 2019 (78%; 1,560 out of 2,010), there was a considerable drop in the actual number of new diagnoses (45%, from 1,560 in 2019 to 860 in 2020) in this setting (adjusted for missing information).

Among gay and bisexual men, the number of HIV diagnoses first made in England decreased by 41% from 1,500 in 2019 to 890 in 2020 (adjusted for missing information) ([Figure 12](#)).

**Figure 12. New HIV diagnoses by probable exposure group, gender and location of first diagnosis: England, 2016 to 2020**



(1) Less than 0.5% of new HIV diagnoses were first diagnosed in the UK outside England

Since the number of men testing remained at 2018 levels, it is likely that the decline in HIV diagnoses in this population is indicative of a reduction in incidence rather than reduced access to HIV testing due to COVID-19.

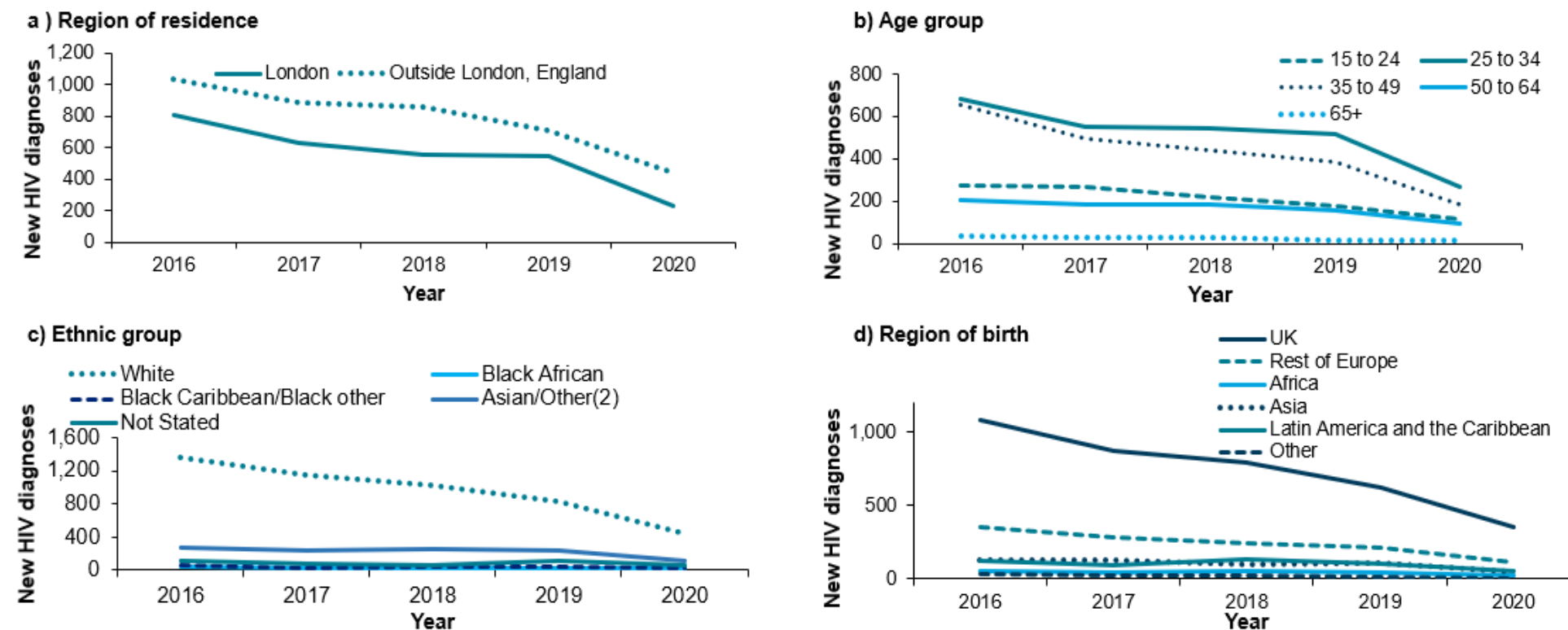
This hypothesis is supported by a CD4 back-calculation method (see [Appendix 1](#)), which estimated that HIV incidence among gay and bisexual men declined since 2011, preceding the steep fall in new HIV diagnoses in 2014 ([41](#)). HIV incidence among gay and bisexual men in England declined by 91%, from an estimated peak of 2,730 (95% CrI 2,560 to 2,900) in 2011, to 400 (95% CrI 240 to 800) in 2019 to an estimated 250 (95% CrI 110 to 710) in 2020, equivalent to less than 1 per 1,000 gay and bisexual men in England. However, more conservative sensitivity analyses suggest up to 590 (95% CrI 200 to 2,050) new infections in gay and bisexual men in England in 2020 may have occurred, if we assume the extreme scenario that the lockdowns did not reduce new infections but did reduce the number of people testing and being diagnosed.

The decline in new HIV diagnoses first made in England was steepest in gay and bisexual men in London (56%, from 800 in 2019 to 350 in 2020), White men (45%, from 1,210 in 2019 to 660 in 2020) and those aged under 50 years (47%, from 1,500 in 2019 to 800 in 2020). The smallest declines in gay and bisexual men first diagnosed in England (adjusted for missing demographic data) were observed among Black African men (33%, from 60 in 2019 to 40 in 2020), aged 50 years and over (36%, from 220 in 2019 to 140 in 2020) and living in England outside of London (36% drop, from 920 in 2019 to 590 in 2020) ([Figure 13](#)).

In 2020, after adjusting for missing information, an estimated 67% (630 out of 940) of gay and bisexual men first diagnosed in England probably also acquired HIV in England (see [Appendix 1](#) and [42](#)).

Just over half (54%, 360 out of 670) of newly diagnosed gay and bisexual men first diagnosed in England in 2020 were born in the UK and 17% elsewhere in Europe. Both groups experienced a decline in HIV diagnoses since 2016; 1,080 to 360 (67%) in UK-born men and 350 to 110 (69%) among men born elsewhere in Europe. The number of new diagnoses first made in England among gay and bisexual men born in Africa declined by 40% between 2016 and 2020 (from 50 to 30), by 62% among those born in Asia (130 to 50), by 62% among those born in Latin America and the Caribbean (130 to 50) and by 75% among those born in another place (40 to 10).

**Figure 13. New HIV diagnoses among gay and bisexual men (first diagnosed in England (1)) by demographics: England, 2016 to 2020**



(1) <0.5% of new HIV diagnoses were first diagnosed in the UK outside England.

(2) Other ethnic groups include Mixed and Other ethnicity.

## Late diagnoses and deaths

In 2020, 40% of gay and bisexual men were diagnosed with CD4 cell counts of less than 350 cells/mm<sup>3</sup> (230 out of 570 diagnoses with CD4 information, first diagnosed in England), and after correction for recent seroconversion, the percentage diagnosed late was 28% (160 out of 570 diagnoses with CD4 information). After further adjustment for missing CD4 and probable exposure route, a total of 300 gay and bisexual men were diagnosed late in 2020 (corrected for recent seroconversion). This figure is lower than the estimated number diagnosed late in 2019 (440, a 32% drop) and in 2016 (510, a 41% drop). There was a difference in the proportion of gay and bisexual men diagnosed late by ethnicity, for example 22% among Black African, and 31% among White gay and bisexual men.

Adjusting for missing CD4 and probable exposure route, the one-year mortality rate amongst those diagnosed late in 2019 was 29 per 1,000 in 2019, and, amongst those diagnosed promptly, 3 per 1,000.

## UNAIDS targets

In 2020, the UNAIDS targets were exceeded for the estimated 45,690 (95% CrI 44,830 to 46,800) gay and bisexual men living with HIV in England for the fourth consecutive year, with 96% (95% CrI 94% to 97%) diagnosed, 99% receiving treatment and 98% virally suppressed.

Using the MPES models (see [Appendix 1](#)) ([35](#), [36](#)), the number of gay and bisexual men living with an undiagnosed HIV infection was 1,760 (95% CrI 1,170 to 2,780) in 2020, a continued decline from 3,440 (95% CrI 1,980 to 6,180) in 2018 and 2,620 (95% CrI 1,530 to 4,770) in 2019. Estimates were similar using the CD4 back-calculation method (see [Appendix 1](#)) with 1,400 undiagnosed (95% CrI 850 to 2,780). A worst case sensitivity analysis was conducted and an extreme scenario was assumed whereby the lockdowns did not reduce the number of infections but did reduce the number of people testing and being diagnosed. This suggests that there were up to 2,290 (95% CrI 1,040 to 5,790) gay and bisexual men with undiagnosed HIV in England in 2020. Overall, 40,220 were estimated to have received ART (99%) and 33,590 (98%) and were virally suppressed.

## Number with transmissible levels of virus

Among the estimated 45,690 (95% CrI 44,830 to 46,800) gay and bisexual men living with HIV, the proportion who had transmissible levels of virus was 7% (3,200), the converse of the substantive 93% UNAIDS 90-90-90 targets for gay and bisexual men in 2020. Additional analyses showed that up to 7,900 gay and bisexual men had transmissible levels of virus, equivalent to 17% of gay and bisexual men living with HIV in England. Of these, an estimated 1,760 (95% CrI 1,170 to 2,780) (22%) were undiagnosed, 3,370 (43%) were diagnosed but not referred to specialist HIV care or retained in care, 440 (6%) attended for care but were not receiving treatment, and 650 people (8%) were on treatment but not virally suppressed. The

remaining 1,670 people (21%) had attended for care but were missing evidence of viral suppression. In all scenarios except the last, the UNAIDS 95-95-95 substantive target was met.

## Heterosexual men and women

We define heterosexual men and women in relation to the type of sexual contact through which HIV is most likely to be or has been acquired. Any man who has had sex with a man is included in gay and bisexual men group. However, some women in the heterosexual group will identify as having a different sexual identity.

### HIV testing

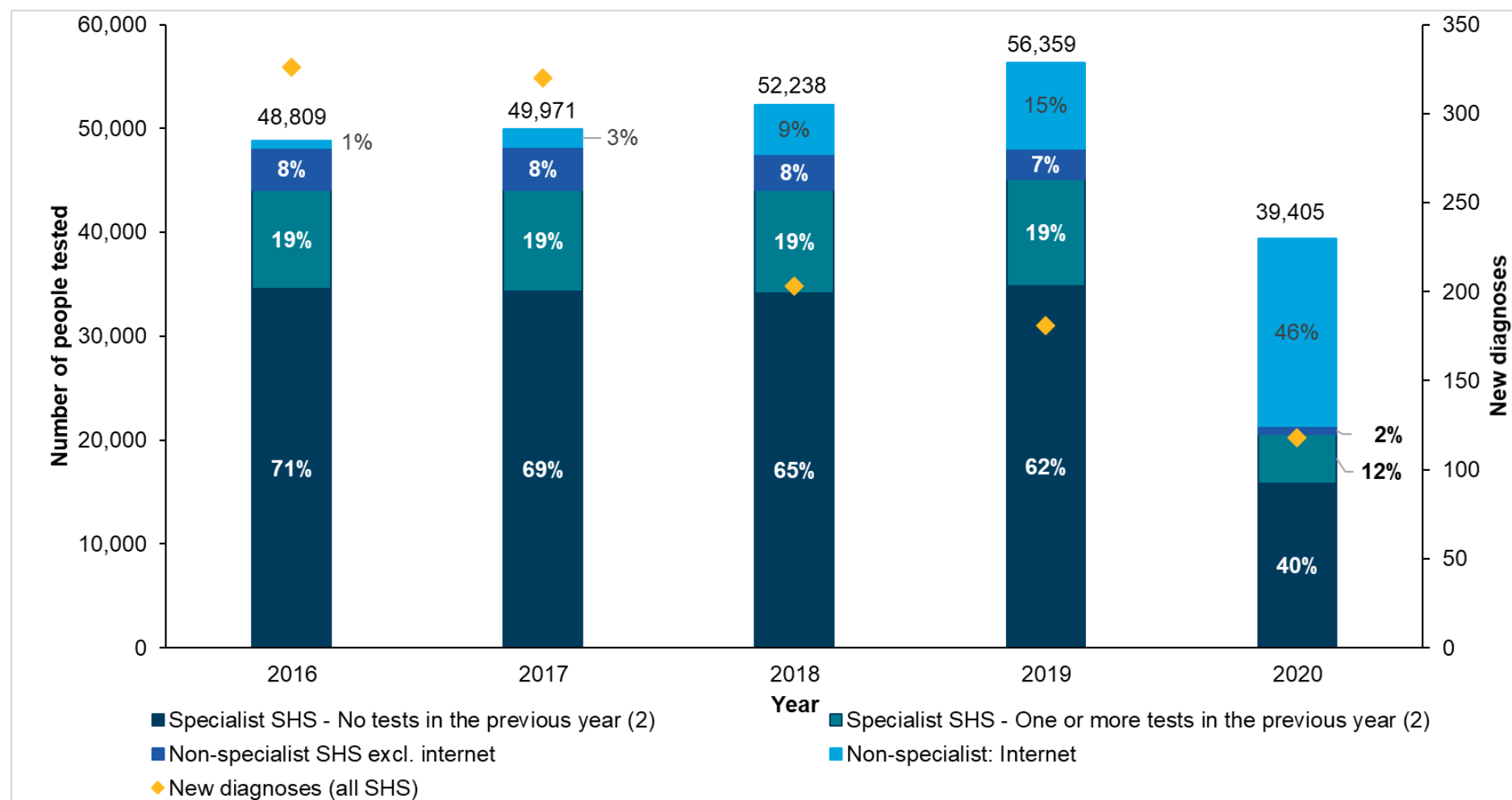
The number of heterosexuals tested for HIV in all SHS fell by 33% from 1,142,950 in 2019 to 760,260 in 2020 and was below the level reached in 2016 (1,012,620) (adjusted for missing information). Similar drops in testing were observed among Black African heterosexuals (34% for men and 24% for women) and White heterosexuals (43% and 30%, respectively).

Compared with 2019, testing via internet-based services in 2020 increased by 79% (58,270 to 104,070) among heterosexual men and by 95% (113,680 to 221,640) among heterosexual and bisexual women (adjusted for missing information). Testing via internet-based services rose substantially among Black African heterosexual men from 3,940 in 2019 to 8,160 in 2020 and from 5,480 to 12,170 in women ([Figure 14](#)). Five per cent of all tests made via internet-based SHS were in Black African heterosexual men and women.

New HIV diagnoses in SHS in heterosexual men and women decreased from 1,060 in 2016 to 600 in 2019 and fell by 30% to 420 new HIV diagnoses in 2020. Of the latter, 40% were among White heterosexuals (130 men and 40 women) and 48% (200) were people born in the UK (adjusted for missing data).

A total of 140 Black African heterosexual men and women were diagnosed at SHS in 2020. The proportion testing positive among Black African women was 0.4% (90 new diagnoses adjusted for missing ethnicity) and 0.2% among Black African men (45 new diagnoses adjusted for missing ethnicity). The proportion testing positive was highest among Black African heterosexual men and women who were born in a country with a high diagnosed HIV prevalence (0.8% versus 0.1% for those born elsewhere) and these accounted for 64% (90 out of 140 adjusted for missing ethnicity) of new diagnoses among Black African heterosexual men and women in SHS in 2020. The proportion testing positive was also highest among Black African heterosexual men and women who had not tested in the past year at the same clinic (0.7%, 110 diagnoses) compared with more frequent testers (0.04%, <5 diagnoses).

**Figure 14. Number of people tested and number of new HIV diagnoses among Black African heterosexual attendees, by service type and repeat testing (1) (for specialist SHS): England, 2016 to 2020**



(1) Despite deduplication of patients attending the same clinic this may represent an overestimation of the true number of individuals tested. Some individuals may have attended multiple clinics or multiple internet-based services for HIV testing.

(2) Previous tests relative to the date last tested within the year of interest.



Overall, women were more likely to decline a test than men in specialist SHS in 2020 (20% for women versus 12% for men); this was also apparent among Black African heterosexuals (17% for women versus 8% for men). HIV testing coverage was 68% among Black African heterosexual men, 54% among White heterosexual men, 46% for Black African heterosexual women and 35% for White heterosexual women ([Figure 3](#)).

Through the national HIV self-sampling scheme (see [\(25\)](#) and Community testing above), more heterosexual women tested than men (31% versus 17%) but a higher reactivity rate was observed for heterosexual women than for men (0.6% versus 0.4%).

## New HIV diagnoses

The number of HIV diagnoses first made in England among heterosexual people decreased by 23% (from 1,310 in 2019 to 1,010 in 2020, adjusted for missing information). The decline was 40% among White heterosexuals (from 470 in 2019 to 280 in 2020) and Black Caribbean heterosexuals (from 50 to 30) but less pronounced among Black Africans (25%, 400 to 300) and among Asians (17%, 60 to 50). The decline in HIV diagnoses first made in England among heterosexual men and women is likely to have been impacted by reduced access to HIV testing in 2020 and rather than longer term decreased transmission.

The proportion of heterosexual men and women who probably acquired HIV in England and were also first diagnosed in England was 44% (160 out of 360) and 41% (160 out of 390), respectively. Among heterosexual men and women born abroad but diagnosed with HIV in England, 49% were estimated to have acquired HIV after arrival in England.

## Late diagnoses and deaths

The proportion of heterosexual men who were diagnosed late (first diagnosed in England and after correction for recent seroconversion, see [Appendix 1](#)) was high, with 55% (170 out of 310), compared with 50% (170 out of 340) among heterosexual women. The overall rate of late diagnoses for all heterosexuals was 53%. Rates were higher among Black African heterosexuals (59%), compared with White heterosexuals (51%). The proportion diagnosed late was highest among older heterosexual men and women: 63% (120 out of 190) among those aged over 50 years compared with 36% (69 out of 190) aged 18 to 34 years. In 2020, there were 250 deaths reported (41% of all deaths) among heterosexual men and women, a 32% increase, compared with 2019 (190 deaths).

Overall, mortality rate within a year of diagnosis was 16 per 1,000 among heterosexuals diagnosed late in 2019 (corrected for recent seroconversion) compared with 5 per 1,000 among those diagnosed promptly.



## UNAIDS targets

In 2020, an estimated 47,420 (95% CrI 46,530 to 49,550) heterosexual men and women were living with HIV in England. An estimated 94% (41,530) (95% CrI 90% to 96%) were diagnosed, 99% (41,020) were on treatment and 97% (32,180) were virally suppressed.

An estimated 2,750 (95% CrI 2,070 to 4,870) were undiagnosed, 830 (95% CrI 590 to 1,420) in London and 1,910 (95% CrI 1,410 to 3,550) outside London. There was little variation in relation to ART coverage and viral suppression.

While the 1,880 Black African heterosexuals who were not retained in care between 2019 and 2020 was bigger than the 1,450 White heterosexuals, this reflects the relevant size of the groups among all people living with diagnosed HIV infection. Our data shows little difference in retention in care, treatment coverage and viral suppression by different ethnic groups; however, recent research has found differences in some clinical outcomes ([43](#)).

## Number with transmissible levels of virus

It was estimated that the proportion of heterosexual men and women living with HIV who had transmissible levels of virus was 10% (4,740), the converse of the substantive 90% UNAIDS 90-90-90 targets for heterosexuals in 2020. Additional analyses showed that up to 10,750 heterosexuals living with HIV in England had transmissible levels of virus, equivalent to 23% of people living with HIV in England. Of these, an estimated 2,750 (95% CrI 2,070 to 4,870) (26%) were undiagnosed, 3,470 (32%) were diagnosed but not referred to specialist HIV care or retained in care, 660 (6%) attended for care but were not receiving treatment, and 1,000 people (9%) were on treatment but not virally suppressed. The remaining 2,870 people (27%) had attended for care but were missing evidence of viral suppression. The UNAIDS 90-90-90 target would be met in all instances.

## Conclusion

Measures to curb the COVID-19 pandemic in 2020 had a profound impact on social mixing and sexual behaviour as well as access to, and the configuration of, HIV testing and HIV care services. This combined with difficulties in data collection and completeness has made interpreting the HIV epidemic in England in 2020 extremely complex.

The risk of death from COVID-19 among people with HIV was low, but twice as high as the general population during the first wave. Almost all deaths occurred in people with co-morbidities, highlighting the need for close monitoring of people with HIV and other clinical complexities. The vaccine programme will likely have reduced the risk of acquiring COVID-19, and of severe outcomes from COVID-19 among people living with HIV.

HIV testing and HIV care services were significantly reduced in 2020, and during the first wave of COVID-19 in particular, with a shift to telephone consultations and internet testing. However, the decline in HIV testing among gay and bisexual men was modest; the number tested was higher than that reported in 2018. These facts coupled with evidence of reduced sexual contact indicate that the decline in HIV diagnoses in gay and bisexual men observed in 2020 reflects a true reduction in transmission. This interpretation is further supported by modelled estimates showing a decline in incidence across a number of sensitivity analyses assuming counterfactual scenarios. However, these trends may reverse as social restrictions due to COVID-19 relax, with some evidence of increased higher risk behaviours in the latter part of 2020.

In contrast, there is little evidence that the decline in new HIV diagnoses among heterosexual men and women are due to reduced transmission. These declines must be interpreted with great caution. This is because the rate of decline was low in previous years and the uptake of PrEP remains very low in this group. Furthermore, in 2020, the number of heterosexual adults having an HIV test fell substantially and high numbers of eligible heterosexuals did not have an HIV test due to service reconfigurations in response to COVID-19. We may see a rise in late HIV diagnoses in the coming years as a result.

The delivery of HIV outpatient care changed enormously in 2020, with many patients seen virtually. It is important to assess whether this change is acceptable to patients in the long term, and whether there is any inherent risk in less frequent monitoring of CD4 counts and viral loads. It is also of concern that the number of people not retained in care doubled in 2020; services will need support to re-engage this population back into care.

While England reached the UNAIDS 95-95-95 targets for the first time in 2020, counterfactual scenarios suggest that in the worst case scenario (where those with missing viral load information are all assumed to have detectable virus), up to 24% of people living with HIV could have transmissible viral levels. If we are to be successful in ending HIV transmission, we must tackle transmissible viral load using a combination approach that not only prevents people from acquiring HIV (through condoms and PrEP) but works to improve HIV testing services and to ensure people living with diagnosed HIV infection receive the support they need to remain in care, on treatment, and virally suppressed with a good quality of life.

## The HIV Action Plan

In 2020, the HIV Commission published a set of recommendations as an innovative approach to end HIV transmissions in England by 2030 ([40](#)). Formed of 12 commissioners, the Commission collated evidence received from 97 written contributors including national, regional and local stakeholders, experts and community members.

The HIV Action Plan proposes a set of actions building on the HIV Commission recommendations. Published on 1 December 2021, the HIV Action plan sets out the ambition to reduce new HIV diagnoses first made in England by 80% by 2025, and to reduce AIDS and

HIV-related deaths. To achieve these aims, a combination prevention approach ([44](#)) will be implemented focussing on prevent, test, treat and retain.

To support the Action Plan, a monitoring and evaluation framework will be published in early 2022. This will monitor progress towards the 2025 ambition at national, regional and local levels, as well as measuring the extent to which the actions set by the Plan are implemented.

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# Appendix 1

## Methods and data sources

### HIV testing

#### 1.1 Levels of sexual health services

Sexual health services (SHS) include both specialist (level 3) and non-specialist (level 1 and 2) SHS. Specialist SHS refers to genitourinary medicine (GUM) and integrated GUM, and sexual and reproductive health (SRH) services. Non-specialist SHS refers to SRH services, young people's services, internet-based services, termination of pregnancy services, pharmacies, outreach and general practice, and other community-based settings. Further details on the levels of sexual healthcare provision are provided in Appendix B of the BASHH Standards for the Management of STIs ([45](#)).

#### 1.2 Proportion positive

The way HIV test positivity in SHS is calculated has changed. It is now based on people testing at all types of SHS, whereas previously it was based on specialist SHS only. The change was made so that the positivity calculations would include the large and growing proportion of attendees who test at online SHS. The new positivity rates in this report and accompanying tables and slides are lower than those previously published because they now include people tested at non-specialist SHS who may have a lower risk of HIV than those attending specialist SHS.

#### 1.3 Geography

This year's data has changed from being based on the location of the SHS attended to the attendees' area of residence. This was because internet-based SHS are based in just a few areas.

#### Late diagnoses corrected for recency of infection

Late diagnosis is an important metric for HIV surveillance, as those diagnosed late are at greater risk of ill-health and death, but also of onward transmission. People diagnosed late are estimated to have lived with HIV unaware for at least 3 to 5 years ([30](#), [31](#)) and have a tenfold risk of death within a year compared to those diagnosed promptly. The definition of late HIV diagnosis historically used in the UK is a CD4 count less than 350 cells/mm<sup>3</sup> within 91 days of diagnosis. However, a proportion of diagnoses are made while a person is undergoing seroconversion. So they may show a low CD4 count since they have recently acquired HIV ([30](#)) and groups that test frequently for HIV are at increased risk of being diagnosed during a period of seroconversion. As a result, a number of diagnoses made with a CD4 count less than 350 cells/mm<sup>3</sup> are not late should be reclassified. Their inclusion provides misleading results in relation trends and in health outcomes of people diagnosed late.

We performed this correction using 2 pieces of evidence which suggest recent infection: the results of a Recent Infection Testing Algorithm (RITA), which combines serological recency test results with diagnosis and treatment data, and an individual's HIV testing history. If an individual had a CD4 count less than 350 cells/mm<sup>3</sup> at diagnosis alongside either a RITA result indicating recent infection, or a negative test within 24 months of diagnosis, this individual's diagnosis would be considered not late by our corrected late diagnosis definition. This corrected definition is still under development and displays substantial heterogeneity across subgroups, we present and discuss both definitions.

### Multi-Parameter Evidence Synthesis (MPES) statistical model

MPES is a Bayesian statistical model that combines and triangulates multiple sources of surveillance and survey data. Information on exposure group sizes, numbers diagnosed and in care, HIV prevalence from prevalence surveys, and data on HIV testing in various groups are synthesised to estimate the number of persons living with undiagnosed HIV. The model is reviewed each year to take into account changes in data sources and changes in the HIV epidemic ([35](#), [36](#)).

The MPES model provides estimates of the number of all people living with HIV in the UK and England, including those undiagnosed.

Due to the impact of the COVID-19 pandemic on sexual behaviours, healthcare attendances and HIV testing, adjustments were made to some data sources to account for changes in attendance patterns.

Firstly, SHS attendance was severely disrupted in 2020 by the COVID-19 pandemic, with a marked fall in attendances during the April to June 2020 “lockdown” period and lower rates overall compared to 2019. Diagnoses of STIs fell markedly in 2020, but the number of new HIV diagnoses made during this period did not fall proportionately with attendances, leading to higher proportions testing positive compared to 2019.

Reductions of in-person SHS attendance may have been mitigated by internet testing, which increased markedly in 2020. In order to account for this potential shift, we redefined our SHS-using population to include both in-person and internet consultations, rather than in-person consultations alone.

This new definition, applied retrospectively to the 5 years from 2016 to 2020, substantially increased the size of the SHS-using population, in particular for gay and bisexual men, resulting in reductions in the estimates of the proportion undiagnosed. Further work is required to understand whether undiagnosed prevalence has continued to decline for gay and bisexual men, or if this reduction is partly due to a dilution in risk, with the addition of internet testing to the population of SHS attendees.



Secondly, the observed number of people living with diagnosed HIV who are in care has been affected by the pandemic, with a marked reduction in consultations for those in care over the April to June 2020 period, and a lower number observed at any time in 2020 compared with 2019. In previous years, there had been a steady rise over time.

To account for the possibility of missed attendances in 2020, individual attendance patterns were modelled over time up to 2019, using a discrete-time survival model, and a forecast of attendance for 2020 was produced, which was used in place of the observed data. The model accounted for risk group, age, sex, ethnicity and region, and allowed for variability in individual attendance patterns.

The resulting forecast produced numbers in care in 2020 that were in line with the trend across previous years. However, this forecast may be an overestimate if the number leaving care (through death, migration or drop-out) was higher in 2020 than in previous years. Some caution should be applied when considering the 2020 estimates, as further work is still required to disentangle the behavioural impact of the COVID-19 pandemic on sexual risk and HIV transmission, and the distortion in surveillance data due to reduced attendance to services.

### CD4 back-calculation

The CD4 back-calculation model is a Bayesian statistical model which jointly estimates HIV incidence and diagnosis rates among gay and bisexual men from HIV and AIDS diagnosis data and CD4 cell count at diagnosis information ([41](#)). The model partitions undiagnosed infections into model states according to CD4 count and assumes known rates of disease progression in the absence of treatment. The model is fitted to observed data on the number of diagnoses and their CD4 count distribution, to estimate incidence and diagnosis rates.

The 2020 COVID-19 restrictions have influenced both sexual behaviours and HIV incidence as well as healthcare use leading to diagnosis. The primary analysis reported allows for both to have been affected, to an unobserved degree. Two sensitivity analyses were explored that assumed different extremes of how the restrictions affected the HIV epidemic: a best-case scenario assumes that testing continued to follow the same trend until 2019, but incidence was affected by the restrictions; and a worse-case scenario assumes that incidence continued to follow the same trend until 2019, but testing was affected by the restrictions.

### UK acquired definition

Among those born abroad, UK acquired figures are estimated by applying CD4 counts at diagnosis to modelled slopes of CD4 decline (within a separate seroconverter data set) to estimate time of infection for an individual ([42](#)). The estimated time of infection is combined with information on country of birth and year of arrival to estimate country of residence at the time of infection.

## Appendix 2

### Local authorities by diagnosed HIV prevalence band above 2 per 1,000 population aged 15 to 59 years: England, 2020

Diagnosed HIV prevalence bands are based on the number of people diagnosed with HIV and accessing care at HIV outpatient clinics in a given year. They are expressed per 1,000 residents aged 15 to 59 years (population data from Office of National Statistics mid-2020 population estimate).

Low diagnosed HIV prevalence (<2 per 1,000), high ( $\geq 2$  and <5 per 1,000), extremely high ( $\geq 5$  per 1,000 population aged 15 to 59 years).

HIV prevalence band	Local authority	Residents accessing HIV-related care (aged 15 to 59 years)	Estimated resident population in 1,000s (aged 15 to 59 years)	Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)
High ( $\geq 2$ and <5 per 1,000)	Adur	73	33.98	2.15
High ( $\geq 2$ and <5 per 1,000)	Barnet	723	241.36	3
High ( $\geq 2$ and <5 per 1,000)	Bedford	254	98.55	2.58
High ( $\geq 2$ and <5 per 1,000)	Bexley	414	146.37	2.83
High ( $\geq 2$ and <5 per 1,000)	Birmingham	1882	700.08	2.69

<b>HIV prevalence band</b>	<b>Local authority</b>	<b>Residents accessing HIV-related care (aged 15 to 59 years)</b>	<b>Estimated resident population in 1,000s (aged 15 to 59 years)</b>	<b>Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)</b>
High (≥2 and <5 per 1,000)	Blackpool	359	76.56	4.69
High (≥2 and <5 per 1,000)	Bournemouth, Christchurch and Poole	612	223.21	2.74
High (≥2 and <5 per 1,000)	Brent	952	201.97	4.71
High (≥2 and <5 per 1,000)	Bristol, City of	747	305.43	2.45
High (≥2 and <5 per 1,000)	Bromley	482	192.9	2.5
High (≥2 and <5 per 1,000)	Bury	236	108.46	2.18
High (≥2 and <5 per 1,000)	Coventry	757	243.98	3.1
High (≥2 and <5 per 1,000)	Crawley	245	67.41	3.63
High (≥2 and <5 per 1,000)	Dartford	141	68.05	2.07
High (≥2 and <5 per 1,000)	Derby	411	151	2.72
High (≥2 and <5 per 1,000)	Ealing	789	207.58	3.8

<b>HIV prevalence band</b>	<b>Local authority</b>	<b>Residents accessing HIV-related care (aged 15 to 59 years)</b>	<b>Estimated resident population in 1,000s (aged 15 to 59 years)</b>	<b>Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)</b>
High (≥2 and <5 per 1,000)	Eastbourne	145	54.05	2.68
High (≥2 and <5 per 1,000)	Enfield	826	201.04	4.11
High (≥2 and <5 per 1,000)	Gravesham	142	60.79	2.34
High (≥2 and <5 per 1,000)	Harlow	141	50.13	2.81
High (≥2 and <5 per 1,000)	Harrow	348	146.98	2.37
High (≥2 and <5 per 1,000)	Hastings	127	51.37	2.47
High (≥2 and <5 per 1,000)	Hertsmere	134	59.17	2.26
High (≥2 and <5 per 1,000)	Hillingdon	482	188.38	2.56
High (≥2 and <5 per 1,000)	Hounslow	651	167.99	3.88
High (≥2 and <5 per 1,000)	Leeds	1345	490.53	2.74
High (≥2 and <5 per 1,000)	Leicester	876	222.53	3.94

<b>HIV prevalence band</b>	<b>Local authority</b>	<b>Residents accessing HIV-related care (aged 15 to 59 years)</b>	<b>Estimated resident population in 1,000s (aged 15 to 59 years)</b>	<b>Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)</b>
High (≥2 and <5 per 1,000)	Lewes	118	53.5	2.21
High (≥2 and <5 per 1,000)	Liverpool	676	317.36	2.13
High (≥2 and <5 per 1,000)	Luton	476	127.13	3.74
High (≥2 and <5 per 1,000)	Merton	513	128.86	3.98
High (≥2 and <5 per 1,000)	Milton Keynes	568	157.82	3.6
High (≥2 and <5 per 1,000)	Norwich	212	92.21	2.3
High (≥2 and <5 per 1,000)	Nottingham	515	225.13	2.29
High (≥2 and <5 per 1,000)	Peterborough	275	116.76	2.36
High (≥2 and <5 per 1,000)	Portsmouth	321	136.61	2.35
High (≥2 and <5 per 1,000)	Reading	297	100.62	2.95
High (≥2 and <5 per 1,000)	Redbridge	477	187.33	2.55

<b>HIV prevalence band</b>	<b>Local authority</b>	<b>Residents accessing HIV-related care (aged 15 to 59 years)</b>	<b>Estimated resident population in 1,000s (aged 15 to 59 years)</b>	<b>Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)</b>
High (≥2 and <5 per 1,000)	Richmond upon Thames	268	116.72	2.3
High (≥2 and <5 per 1,000)	Rochdale	287	128.46	2.23
High (≥2 and <5 per 1,000)	Rushmoor	124	57.33	2.16
High (≥2 and <5 per 1,000)	Sandwell	564	193.14	2.92
High (≥2 and <5 per 1,000)	Slough	309	90.01	3.43
High (≥2 and <5 per 1,000)	Southampton	405	162.95	2.49
High (≥2 and <5 per 1,000)	Southend-on-Sea	312	103.04	3.03
High (≥2 and <5 per 1,000)	Spelthorne	118	56.76	2.08
High (≥2 and <5 per 1,000)	Stevenage	138	52.11	2.65
High (≥2 and <5 per 1,000)	Stoke-on-Trent	321	148.37	2.16
High (≥2 and <5 per 1,000)	Sutton	312	123.35	2.53

<b>HIV prevalence band</b>	<b>Local authority</b>	<b>Residents accessing HIV-related care (aged 15 to 59 years)</b>	<b>Estimated resident population in 1,000s (aged 15 to 59 years)</b>	<b>Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)</b>
High (≥2 and <5 per 1,000)	Tameside	302	130.62	2.31
High (≥2 and <5 per 1,000)	Thurrock	244	104.3	2.34
High (≥2 and <5 per 1,000)	Torbay	145	68.04	2.13
High (≥2 and <5 per 1,000)	Tower Hamlets	1064	236.93	4.49
High (≥2 and <5 per 1,000)	Trafford	279	135.58	2.06
High (≥2 and <5 per 1,000)	Walsall	399	163.02	2.45
High (≥2 and <5 per 1,000)	Waltham Forest	776	176.62	4.39
High (≥2 and <5 per 1,000)	Watford	159	58.89	2.7
High (≥2 and <5 per 1,000)	West Northamptonshire	563	232.13	2.43
High (≥2 and <5 per 1,000)	Woking	126	56.57	2.23
High (≥2 and <5 per 1,000)	Wolverhampton	531	153.12	3.47



<b>HIV prevalence band</b>	<b>Local authority</b>	<b>Residents accessing HIV-related care (aged 15 to 59 years)</b>	<b>Estimated resident population in 1,000s (aged 15 to 59 years)</b>	<b>Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)</b>
High (≥2 and <5 per 1,000)	Worthing	152	60.52	2.51
Extremely high (≥5 per 1,000)	Barking and Dagenham	659	130.6	5.05
Extremely high (≥5 per 1,000)	Brighton and Hove	1450	197.75	7.33
Extremely high (≥5 per 1,000)	Camden	1242	188.77	6.58
Extremely high (≥5 per 1,000)	City of London	65	7.07	9.19
Extremely high (≥5 per 1,000)	Croydon	1321	233.23	5.66
Extremely high (≥5 per 1,000)	Greenwich	1114	185.99	5.99
Extremely high (≥5 per 1,000)	Hackney	1238	193.88	6.39
Extremely high (≥5 per 1,000)	Hammersmith and Fulham	977	122.95	7.95
Extremely high (≥5 per 1,000)	Haringey	1136	175.68	6.47
Extremely high	Islington	1181	180.34	6.55

<b>HIV prevalence band</b>	<b>Local authority</b>	<b>Residents accessing HIV-related care (aged 15 to 59 years)</b>	<b>Estimated resident population in 1,000s (aged 15 to 59 years)</b>	<b>Diagnosed HIV prevalence per 1,000 (aged 15 to 59 years)</b>
(≥5 per 1,000)				
Extremely high (≥5 per 1,000)	Kensington and Chelsea	927	98.14	9.45
Extremely high (≥5 per 1,000)	Lambeth	2993	228.56	13.09
Extremely high (≥5 per 1,000)	Lewisham	1577	203.85	7.74
Extremely high (≥5 per 1,000)	Manchester	2223	377.67	5.89
Extremely high (≥5 per 1,000)	Newham	1305	239.77	5.44
Extremely high (≥5 per 1,000)	Salford	836	163.26	5.12
Extremely high (≥5 per 1,000)	Southwark	2545	221.63	11.48
Extremely high (≥5 per 1,000)	Wandsworth	1175	228.56	5.14
Extremely high (≥5 per 1,000)	Westminster	1701	181.03	9.4

# Acknowledgements

## Contributors

Addow A, Aghaizu A, Brown AE, Chau C, Connor N, Cooper N, Croxford S, De Angelis D, Delpech VC, Ekajeh J, Folkard K, Harris R, Kelly C, Kirwan PD, Lester J, McCall M, Mackay N, Martin V, Mitchell H, Mohammed H, Morgan J, Mou D, Murphy G, Newbigging-Lister A, Peters H, Presanis A, Rafeeq S, Ratna N, Saunders J, Shah A, Simmons R, Sullivan A, Sun S, Toswill J.

## Suggested citation

Martin V, Shah A, Mackay N, Lester J, Newbigging-Lister A, Connor N, Brown AE, Sullivan AK, Delpech VC, and contributors. HIV testing, new HIV diagnoses, outcomes and quality of care for people accessing HIV services: 2021 report. The annual official statistics data release (data to end of December 2020). December 2021, UK Health Security Agency, London

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Version 1

Prepared by: Martin V, Shah A, Mackay N, Lester J, Newbigging-Lister A, Connor N, Brown A, Sullivan A, Delpech V, and contributors.

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Published: December 2021  
Publishing reference: GOV-10491



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