Does the recent increase in HIV diagnoses among men who have sex with men in the United Kingdom reflect a rise in HIV incidence or increased uptake of HIV testing?

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ABSTRACT

Objectives
To determine whether the increase in HIV diagnoses since 1997 among men who have sex with men (MSM) in the UK reflects a rise in HIV incidence or an increase in HIV testing.

Methods
Estimates of HIV incidence were derived using data from UK HIV surveillance systems (HIV diagnoses; CD4 surveillance; unlinked anonymous surveys) for 1997-2004. Data on HIV testing were provided by KC60 statutory returns, voluntary testing and unlinked anonymous surveys in sentinel GUM clinics.

Results
HIV diagnoses among MSM in the UK rose by 54% between 1997 and 2004 (1,382, 2,124), with variation by age and geographic location. There was no increase in the number of HIV diagnoses among MSM <35 years in London, but in all other groups it increased. Throughout the UK, uptake of HIV testing increased significantly among MSM attending GUM clinics between 1997-2004, including among ‘at-risk’ MSM (p<0.001). Direct incidence estimates (STARHS assay) provided no evidence of a statistically significant increase or decrease in HIV incidence. Indirect estimates suggested there may have been a rise in HIV incidence, but these estimates were influenced by the increased uptake of HIV testing.

Conclusions
The number of HIV diagnoses increased among MSM in the UK between 1997 and 2004, except among younger MSM in London where there was no change. It appears that the increase in HIV diagnoses among MSM in the UK since 1997 reflects an increase in HIV testing rather than a rise in HIV incidence.
BACKGROUND
The number of HIV diagnoses among men who have sex with men (MSM) in the UK has risen annually since 1999 [1]. This rise may reflect increasing HIV incidence among MSM or an increase in the uptake of HIV testing. Diagnoses may have also risen because of improved reporting and migration to the UK by HIV-infected MSM. Similar trends in increasing HIV diagnoses have been observed in the Netherlands, Australia and the USA [2,3,4].

Rising HIV diagnoses among MSM in the UK have coincided with an increase in high risk sexual behaviour and other STIs that may facilitate HIV transmission [1,5,6,7,8,9,10,11]. Over the same period, however, there have been initiatives to increase the uptake of HIV testing among GUM clinic attendees. The availability of effective therapies for HIV may have also encouraged more MSM to seek an HIV test [12,13,14].

Although the increase in HIV diagnoses among MSM in the UK has been described before [5], the reasons behind this increase have not been investigated. Does the increase in HIV diagnoses reflect an increase in HIV incidence or an increased uptake of HIV testing? An increase in HIV incidence would have important implications for HIV prevention and targets to reduce HIV transmission among MSM. On the other hand, increased uptake of HIV testing would highlight success in reducing the number of MSM with undiagnosed HIV [12,13,14].
METHODS
National HIV surveillance data for MSM, 1997-2004, were examined to derive estimates of HIV incidence, patterns of HIV testing and changes in HIV reporting.

Data sources
We used surveillance data from a number of sources:

i) Laboratory and clinical reports of HIV diagnoses in the UK;
ii) CD4 surveillance providing information on CD4 cell count at diagnosis for MSM in England and Wales (E&W) (70%) and Scotland (95%);
iii) Unlinked anonymous surveys in 28 sentinel genito-urinary medicine (GUM) clinics throughout the UK (16 clinics in England, Wales and Northern Ireland (E,W&NI), 12 in Scotland), providing data on undiagnosed HIV prevalence and uptake of voluntary confidential testing (VCT) for HIV;
iv) KC60 and ISD(D)5 statutory returns on number of HIV tests from all GUM clinics in E,W&NI and Scotland respectively;
v) Data on voluntary named HIV testing collected in all settings throughout Scotland.

Further details are available from web table.

HIV incidence estimates
HIV diagnoses do not provide a measure of incidence as infection may not be recent. A direct estimate of HIV incidence can be obtained using a laboratory assay (Serological Testing Algorithm for Recent HIV Seroconversion (STARHS)) [15]. Coupled with appropriate information on the population testing negative for HIV, incidence in a defined population can be directly estimated. The technique has been applied to leftover samples from routine syphilis tests among HIV-infected MSM unaware of their HIV status who tested positive on unlinked anonymous testing in 16 sentinel GUM clinics in E,W&NI [16,17].

Indirect methods to examine trends in HIV incidence
i) We examined the proportion and number of HIV diagnoses where CD4 cell count at diagnosis was ≥700 cells/mm³ (“early diagnoses”). An increase in the proportion and number of early diagnoses over time could reflect an increase in incidence, although this could also reflect an increase in HIV testing. Even if this cut-off point excluded some recent seroconverters with low CD4 cell counts, the index would still be valid if the excluded proportion remained constant over time. A ≥500 cells/mm³ cut-off was also investigated.

ii) We examined the proportion and number of HIV diagnoses where CD4 cell count at diagnosis was <200 cells/mm³ (“late diagnoses”). If the proportion and number of late diagnoses remain stable or decline over time, an increase in the number of HIV diagnoses could reflect an increase in HIV incidence. Again, this measure will also be influenced by changing patterns of HIV testing.

HIV testing
i) The number of HIV tests in MSM can be obtained from KC60 statutory returns in E,W&NI and from the surveillance of voluntary named HIV testing in Scotland. Data for E,W&NI exclude 2003 and 2004, as the coding on KC60 statutory returns changed. Most HIV tests among MSM in the UK are conducted in GUM clinics.
The unlinked anonymous GUM survey in 28 UK clinics collects information on uptake of VCT. MSM with previously diagnosed HIV were excluded from all analyses. To determine whether there was differential testing among MSM at ‘higher’ and ‘lower’ risk of acquiring HIV, data are presented separately for: all MSM; HIV-infected MSM; and MSM with an acute STI.

**Reporting changes**

Clinical reporting of HIV diagnoses in E,W&NI was introduced in 2000 to supplement information collected on laboratory, AIDS and death reports. Before 2000, HIV diagnoses were reported by laboratories only. The number of MSM with only a clinical report was examined in an attempt to quantify the impact of reporting changes on the increase in HIV diagnoses between 1997 and 2004. Patients with only a clinical report may reflect improved ascertainment (i.e. before clinical reporting was introduced these patients may not have been notified to the HPA because of a lack of reporting by some laboratories). But they could also reflect “reporting compensation” whereby clinical reports are sent in place of laboratory reports. There were no such reporting changes in Scotland.

**Data analysis**

Changes between 1997 and 2004 were analysed using data from each year categorised into the following five groups: MSM <35 years diagnosed in London; MSM ≥35 years diagnosed in London; MSM <35 diagnosed elsewhere in E,W&NI; MSM ≥35 diagnosed elsewhere in E,W&NI; all MSM diagnosed in Scotland. Categories were chosen to allow comparison with an earlier analysis (with 16-24 and 25-34 years combined because of small numbers in the younger age group) and with a study from the Netherlands [3,5]. Thirty-five years is also the median age of HIV diagnosis for MSM in the UK. Proportional increases over time are relative to the baseline 1997 value when the current increase in high-risk sexual behaviour among UK MSM began to be documented [18,19].

Statistical inference (χ² test-for-trend) was only made for data from sample populations (unlinked anonymous surveys). STARHS statistical analyses have been described elsewhere [16,17]. For sample populations, all years from 1997-2004 were included in the trend analyses but only data for 1997 and 2004 are presented (annual data available on request). For population based data, statistical tests were not undertaken, with comparisons made between 1997 and 2004 only.

**Confidentiality and ethics**

Reports of HIV diagnoses are voluntary and confidential. To maintain patient confidentiality no names are held; soundex codes are used to eliminate duplicate reports [20]. The ethical and legal bases for the unlinked anonymous surveys have been described elsewhere [21]. These surveys comply with guidelines published by the Medical Research Council [22], and Department of Health interim guidelines on the use of human organs and tissue, and the 2004 Human Tissue Act [23,24]. All data are stored on restricted and secure databases, with strict adherence to the Data Protection Act and Caldicott Guidelines [25]. Reporting systems in E,W&NI have approval under the section 60 regulations of the Health and Social Care Act 2001 (Statutory Instrument 1438 – June 2002).
RESULTS

In 1997 there were 1,382 HIV diagnoses among MSM in the UK rising to 2,124 in 2004 (an increase of 54%). Among MSM <35 years in London, the number of diagnoses did not increase between 1997 and 2004 (529, 533) while it increased among MSM ≥35 years in London (369, 572; +55%). For MSM outside London (excluding Scotland), diagnoses increased for men <35 (221, 463; +110%) as well as ≥35 (194, 556; +187%). Diagnoses also increased for MSM in Scotland (79; 131 +66%) (figure 1).

Direct estimates of HIV incidence

Annual HIV incidence among MSM attending GUM clinics in E,W&NI, estimated by STARHS, was 2.4% (95%CI:1.5-4.0) in 1997 and 3.0% (95%CI:1.9-4.6) in 2004, with no significant trend over time [16,17]. Incidence point estimates appeared to rise for MSM ≥35 but there was no statistical evidence of an increase or decrease in any group (figure 2, table 1).

Indirect estimates of HIV incidence

(i) Early diagnoses

The overall proportion of MSM diagnosed in England, Wales and Scotland with a CD4 cell count of ≥700 cells/mm^3 increased from 12% in 1997 to 26% in 2004 (+122%) (table 2). The greatest increase was among MSM ≥35 elsewhere in E&W (+235%). Similar patterns were found using ≥500 cells/mm^3 as a cut-off.

(ii) Late diagnoses

The overall proportion of MSM in England, Wales and Scotland with a CD4 cell count of <200 cells/mm^3 at diagnosis decreased from 30% in 1997 to 21% in 2004 (-29%). The smallest decrease was seen among MSM <35 in London (-28%), while the largest was among MSM in Scotland (-65%) (table 2).

HIV testing

(i) All GUM clinics

The number of HIV tests among MSM attending GUM clinics in London increased from 5,114 in 1997 to 9,387 in 2002 (+84%), elsewhere in E,W&NI from 5,030 to 8,864 (+76%) and in Scotland from 1,040 in 1997 to 2,513 in 2004 (+142%).

(ii) Unlinked anonymous GUM clinics

In 1997, 46% of MSM attending sentinel unlinked anonymous GUM clinics in the UK had a voluntary HIV test, rising to 80% in 2004 (+73%;p<0.001). The largest increase was among MSM <35 in London (+92%), the smallest among those <35 elsewhere in E,W&NI (+42%) (p<0.001) (table 3).

Among HIV-infected MSM, uptake of VCT rose from 24% in 1997 to 57% in 2004 (+133%) (p<0.001). The largest increase was among MSM <35 elsewhere in E,W&NI (+171%) (p<0.001), the smallest among MSM ≥35 in E,W&NI (+15%).

Uptake of VCT among MSM with an acute STI rose from 27% in 1997 to 75% in 2004 (+178%) (p<0.001). The largest increase was among MSM ≥35 in London (+294%), the smallest among MSM <35 in E,W&NI (+99%) (p<0.001).

Summary table
Table 4 summarises percentage changes between 1997 and 2004 in the number of HIV diagnoses, direct and indirect incidence estimates, and uptake of HIV testing.

Reporting changes
Between 1997 and 2004, the proportion of MSM with only a clinical HIV report in E,W&NI increased from 0% (2/1,382) to 22% (476/2,214). The largest changes were observed outside London: <35 years (0% [1/221], 37% [169/463]); ≥35 years (0% [0/212], 33% [183/556]). Some of these increases can be explained by the North West region changing from laboratory to only clinical reporting (data available on request).
DISCUSSION
There was a large increase in the number of HIV diagnoses among MSM across the UK between 1997 and 2004, except for younger (<35 years) MSM in London where there was no change. Among all groups of MSM a substantial increase in the uptake of HIV testing was observed with the biggest increase being among those most 'at-risk' of HIV infection. Increased uptake of HIV testing will have contributed substantially to the rise in HIV diagnoses. However, there was no evidence of a statistically significant increase or decrease in HIV incidence among MSM in E,W&NI using the STARHS assay which provides a direct estimate of incidence. Indirect estimates of HIV incidence, using CD4 cell count at diagnosis, indicated an increase in incidence since the proportion of MSM diagnosed earlier during the course of infection increased in all groups. This increase however, could also reflect a corresponding increase in the uptake of HIV testing. Outside London, in E,W&NI, improvements in the HIV diagnoses reporting system may have also contributed to the increase in the number of diagnoses among MSM.

The fact that HIV diagnoses among younger MSM in London did not increase at all is particularly interesting, given that there has been a substantial increase in HIV testing among this group. Increased uptake of HIV testing among HIV-infected MSM and those with an acute STI indicates that the increase in testing has not just been among 'low risk' younger MSM. Taken together, there is no evidence of an increase in HIV incidence among younger MSM in London, despite an increase in STIs and high risk behaviour in this group [1,5,7,8,9].

Methodological issues
This is the first time that changing patterns of HIV incidence and testing among MSM in the UK have been systematically investigated to explain the recent increase in HIV diagnoses. The strength of this analysis is that data on HIV diagnoses, incidence and testing are all presented in the same paper although disentangling a rise in incidence from an increased uptake of testing is methodologically challenging.

The only direct estimate of incidence was based on data collected in 16 sentinel GUM clinics in E,W&NI participating in the unlinked anonymous survey. Clinics were not randomly selected and so these estimates may not be generalisable to all GUM clinic attendees, particularly outside London. Estimates will also be elevated as GUM clinic attendees tend to be at higher risk of acquiring HIV than other MSM.

The indirect estimates of HIV incidence were based on an increase in early, or a decrease in late diagnoses. However, these indices may also reflect an increase in HIV testing, as well as earlier presentation by MSM. The influence of reporting changes on the increase in HIV diagnoses is difficult to assess, as some centres changed their reporting patterns following the introduction of clinical HIV reporting in 2000.

While increased migration to the UK by HIV-infected MSM may have also impacted on the number of HIV diagnoses, there are as yet no discernable trends in selective migration of HIV-infected MSM to the UK [26]. Unlinked anonymous data show increasing HIV prevalence among MSM in the UK born in some world regions, although absolute numbers are small [27]. Demographic changes within the UK MSM population itself may have also contributed to the stable number of HIV diagnoses among younger MSM in London. However, interpreting census data on all men in relation to changes in the MSM population is difficult and merits further examination.
International trends
In Amsterdam, increasing HIV incidence (measured using STARHS) was observed among MSM over, but not under, 34 years attending STI clinics (1991-2001), accompanied by an increase in STI incidence and ‘high risk’ sexual behaviour [3,29]. Similar HIV incidence trends have been observed in Australia [2]. In E,W&NI, we have not observed an increase in HIV incidence among MSM using the STARHS assay on samples from GUM clinics participating in the unlinked anonymous GUM clinic survey. There has however, been a similar increase in STIs among MSM in the UK as in the Netherlands [1,5]. It is not clear why there are differences in HIV incidence trends between MSM in Amsterdam and London. They may be due to differences in the sample populations or changes in the E,W&NI STARHS denominator over time [16,17].

Conclusions
Our analysis shows that the number of HIV diagnoses increased among MSM in the UK between 1997 and 2004, except among younger MSM in London where there was no change. A substantial increase in the uptake of HIV testing appears to explain the rise in HIV diagnoses. Direct estimates of HIV incidence among MSM in E,W&NI provided no evidence of a statistically significant change in HIV incidence between 1997-2004, indicating that HIV transmission continued at a steady rate among MSM in the UK between 1997 and 2004.

Taken in concert with STI data, our analysis points towards a need for additional investment in targeted sexual health promotion if the goal of reducing HIV transmission among MSM is to be met [12,13,14]. This should be coupled with a further understanding of sexual risk behaviour among MSM [30]. In terms of surveillance, further examination of the relationship between HIV diagnoses, testing and HIV incidence data is required, to explain trends among younger MSM in London and differences between the UK and other countries. Finally, the substantial increase in the uptake of HIV testing among MSM in recent years highlights the recent success of sexual health promotion in reducing the number of MSM with undiagnosed HIV.
Acknowledgements
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Conflict of interest
There are no conflicts of interest.

Contributions of authors
SD and KF conceived the idea for the paper with significant input from JE, TC, AB and KR; SD provided the UK diagnoses data; AB the unlinked anonymous GUM survey data from E,W&NI; GM the unlinked anonymous STARHS data; TC the CD4 surveillance data from E&W; and GC and KR Scottish data. SD undertook the main analysis and writing of the paper, with all authors, particularly JE, involved in interpretation of the results and drafting of the paper. NG is guarantor, oversaw analyses at HPA and also commented on drafts. SD is currently registered for a PhD at City University, London.

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29. van der Bij AK, Stolte IG, Coutinho RA, Dukers NHTM. Increase of sexually transmitted infections, but not HIV, among young homosexual men in Amsterdam: are STIs still reliable markers for HIV transmission? Sex Transm Infect 2005;81:34-37
**Web table:** Description of surveillance systems providing data to estimate changes in HIV incidence, HIV testing and reporting of HIV diagnoses among MSM in the United Kingdom

<table>
<thead>
<tr>
<th>Data source</th>
<th>Methodology</th>
<th>Coverage and exclusions</th>
<th>Used this study for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV diagnoses</td>
<td>Surveillance began in 1982 with AIDS case reporting and expanded to include laboratory reporting of HIV diagnoses in 1985 in England, Wales and Northern Ireland (E,W&amp;NI) and Scotland. In E,W&amp;NI clinical HIV reports collecting more detailed demographic and epidemiological were introduced in 2000 to supplement laboratory reporting. Probable route of infection is collected for all patients.</td>
<td>Laboratories and clinicians throughout E,W&amp;NI and Scotland. These data are combined for analyses.</td>
<td>a) HIV diagnoses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>b) changes in reporting resulting from the introduction of clinical HIV reporting in 2000 in E,W&amp;NI</td>
</tr>
<tr>
<td>Unlinked anonymous genito-urinary medicine (GUM) survey</td>
<td>The unlinked anonymous surveys measure the prevalence of undiagnosed HIV infection in different population sub-groups. The GUM survey estimates undiagnosed HIV prevalence among MSM using residual blood (taken for syphilis serology) for HIV testing after irreversibly unlinking and anonymising the sample from any patient identifiers. Limited information is collected on acute STI diagnoses and the uptake of voluntary confidential testing (VCT).</td>
<td>Sixteen (of 232) GUM clinics in E,W&amp;NI (eight in London, eight elsewhere) and 12 (of 27) GUM clinics in Scotland. Note Scottish data (amalgamated with E,W&amp;NI for analyses) does not include data from Edinburgh for 2002 and 2003. MSM with HIV diagnosed previously are excluded from analyses.</td>
<td>a) direct incidence estimates through STARHS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>b) indirect indicators of incidence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>c) changes in uptake of voluntary confidential testing (VCT)</td>
</tr>
<tr>
<td>CD4 surveillance systems</td>
<td>In England, Wales (E&amp;W) and Scotland surveillance systems monitor trends in immunosuppression among HIV-infected adults, collecting longitudinal data on CD4 cell counts. The CD4 cell count closest to the date of HIV diagnosis is selected if it falls 31 days either side of that date.</td>
<td>64 laboratories in E&amp;W; six immunology testing laboratories in Scotland. Data for E&amp;W are supplemented by using CD4 cell counts from clinical HIV reports of HIV diagnoses.</td>
<td>a) indirect indicators of incidence</td>
</tr>
<tr>
<td>KC60 statutory returns</td>
<td>Data on selected conditions seen and HIV testing at GUM clinics throughout E,W&amp;NI are compiled from KC60 statistical returns. Aggregate data are submitted to the respective national units of the Health Protection Agency. Male homosexual acquisition is reported with HIV testing data.</td>
<td>GUM clinics throughout E,W&amp;NI. KC60 HIV testing data are not available by age group, only region. In 2003 the KC60 coding for HIV testing changed. It is still unclear how this change in coding has affected resulting KC60 data and so results are only presented for 1997-2002.</td>
<td>a) changes in HIV testing</td>
</tr>
<tr>
<td>ISD(D)5 statutory returns</td>
<td>In Scotland, data concerning all episodes of patient care at GUM clinics are compiled from ISD(D)5 returns. Disaggregate, anonymous data are submitted to Information Services Division, National Services, Scotland</td>
<td>All GUM clinics throughout Scotland</td>
<td>a) changes in HIV testing</td>
</tr>
<tr>
<td>HIV denominator study</td>
<td>Data on voluntary named HIV testing undertaken in all settings (including GUM clinics) throughout Scotland since 1988/89. Male homosexual acquisition is reported.</td>
<td>Laboratories throughout Scotland. For most parts of the country, data are derived from a standardised HIV request form.</td>
<td>a) changes in HIV testing</td>
</tr>
</tbody>
</table>
Table 1: HIV incidence, as estimated by STARHS, among previously undiagnosed† MSM in the unlinked anonymous GUM survey in London and elsewhere in England, Wales and Northern Ireland*: 1997 and 2004

<table>
<thead>
<tr>
<th>Area</th>
<th>Age group (years)</th>
<th>1997</th>
<th></th>
<th></th>
<th>Recent infections by STARHS$</th>
<th>2004</th>
<th></th>
<th></th>
<th>Recent infections by STARHS$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Est’d annual incidence per 100 py</td>
<td>95% CI</td>
<td>Negative specimens</td>
<td>Positive specimens</td>
<td>Est’d annual incidence per 100 py</td>
<td>95% CI</td>
<td>Negative specimens</td>
<td>Positive specimens</td>
</tr>
<tr>
<td>London &lt;35</td>
<td>2.58 (1.31-4.85)</td>
<td>2750</td>
<td>142</td>
<td>22</td>
<td>2.80 (1.34-5.31)</td>
<td>2312</td>
<td>99</td>
<td>21</td>
<td>2.80 (1.34-5.31)</td>
</tr>
<tr>
<td>London ≥35</td>
<td>2.58 (1.05-5.66)</td>
<td>1497</td>
<td>81</td>
<td>11</td>
<td>4.16 (2.06-7.68)</td>
<td>1751</td>
<td>110</td>
<td>24</td>
<td>4.16 (2.06-7.68)</td>
</tr>
<tr>
<td>Elsewhere &lt;35</td>
<td>2.04 (0.56-5.67)</td>
<td>950</td>
<td>31</td>
<td>6</td>
<td>1.64 (0.58-3.81)</td>
<td>1855</td>
<td>26</td>
<td>10</td>
<td>1.64 (0.58-3.81)</td>
</tr>
<tr>
<td>Elsewhere ≥35</td>
<td>1.90 (0.28-7.06)</td>
<td>532</td>
<td>14</td>
<td>3</td>
<td>3.78 (1.50-8.17)</td>
<td>1034</td>
<td>47</td>
<td>13</td>
<td>3.78 (1.50-8.17)</td>
</tr>
</tbody>
</table>

Data for other years available on request.

Source: Unlinked anonymous GUM surveys in England, Wales and Northern Ireland [16,17]

†Those who were aware of their HIV status, including men on HAART and those with AIDS, were excluded from analyses.
*Data were not available for Scotland.
$Missing specimens were allocated as reactive or non-reactive in STARHS by reallocation in the same proportion as known specimens by clinic and age group.

Key
E, W&NI = England, Wales and Northern Ireland
GUM = Genito-urinary medicine clinic
STARHS = Serological Testing Algorithm for Recent HIV Seroconversions
95% CI = 95% confidence interval
na = not available
Table 2: Early and late HIV diagnoses (CD4 cell count at diagnosis) among MSM in London, elsewhere in England and Wales, and in Scotland: 1997 and 2004

<table>
<thead>
<tr>
<th>Indirect estimate of HIV incidence</th>
<th>Geographic areas</th>
<th>Age group (years)</th>
<th>Year of HIV diagnosis</th>
<th>% change 1997-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4 count at diagnosis ≥700 cells/mm(^3)</td>
<td>London</td>
<td>&lt;35</td>
<td>n</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥35</td>
<td>47</td>
<td>352</td>
</tr>
<tr>
<td>Elsewhere in E&amp;W</td>
<td>&lt;35</td>
<td>16</td>
<td>100</td>
<td>16.0%</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>8</td>
<td>87</td>
<td>9.2%</td>
</tr>
<tr>
<td>Scotland</td>
<td>All ages</td>
<td>6</td>
<td>59</td>
<td>10.2%</td>
</tr>
<tr>
<td>E&amp;W and Scotland</td>
<td>All ages</td>
<td>99</td>
<td>851</td>
<td>11.6%</td>
</tr>
</tbody>
</table>

| CD4 count at diagnosis <200 cells/mm\(^3\) | London | <35 | 63 | 352 | 17.9% | 41 | 317 | 12.9% | -28% |
|                                             |       | ≥35 | 97 | 252 | 38.5% | 87 | 331 | 26.3% | -32% |
| Elsewhere in E&W                         | <35  | 25  | 100 | 25.0% | 48  | 329 | 14.6% | -42% |
|                                             | ≥35  | 43  | 87  | 49.4% | 124 | 419 | 29.6% | -40% |
| Scotland                                 | All ages | 25 | 59  | 42.4% | 14  | 95  | 14.7% | -65% |
| E&W and Scotland                         | All ages | 253 | 850 | 29.8% | 314 | 1491 | 21.1% | -29% |

Data for other years available on request.

Source: CD4 surveillance schemes in England and Wales and in Scotland

n=number of MSM with CD4 cell count at diagnosis ≥700 cells/mm\(^3\) or <200 cells/mm\(^3\)
N=total number of MSM for whom a CD4 cell count at diagnosis was available

Key
E&W = England and Wales
Table 3: Uptake of voluntary confidential testing (VCT) among MSM* in the unlinked anonymous GUM surveys in London, elsewhere in England, Wales and Northern Ireland, and in Scotland: 1997 and 2004

<table>
<thead>
<tr>
<th>Geographic areas</th>
<th>Age group (years)</th>
<th>Year of HIV diagnosis</th>
<th>% change 1997-2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1997 n</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>&lt;35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>London</td>
<td>&lt;35</td>
<td>1191</td>
<td>2803</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>566</td>
<td>1533</td>
</tr>
<tr>
<td>Elsewhere in E&amp;W</td>
<td>&lt;35</td>
<td>626</td>
<td>982</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>285</td>
<td>545</td>
</tr>
<tr>
<td>Scotland</td>
<td>All ages</td>
<td>451</td>
<td>955</td>
</tr>
<tr>
<td>UK</td>
<td>All ages</td>
<td>3119</td>
<td>6818</td>
</tr>
<tr>
<td></td>
<td>&lt;35</td>
<td>30</td>
<td>141</td>
</tr>
<tr>
<td>London</td>
<td>≥35</td>
<td>20</td>
<td>82</td>
</tr>
<tr>
<td>Elsewhere in E&amp;W</td>
<td>&lt;35</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Scotland</td>
<td>All ages</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>UK</td>
<td>All ages</td>
<td>71</td>
<td>291</td>
</tr>
<tr>
<td></td>
<td>&lt;35</td>
<td>265</td>
<td>1003</td>
</tr>
<tr>
<td>London</td>
<td>≥35</td>
<td>77</td>
<td>455</td>
</tr>
<tr>
<td>Elsewhere in E&amp;W</td>
<td>&lt;35</td>
<td>132</td>
<td>299</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>32</td>
<td>119</td>
</tr>
<tr>
<td>Scotland</td>
<td>All ages</td>
<td>75</td>
<td>283</td>
</tr>
<tr>
<td>UK</td>
<td>All ages</td>
<td>581</td>
<td>2159</td>
</tr>
</tbody>
</table>

Data for other years available on request.

Source: Unlinked anonymous GUM surveys in England, Wales and Northern Ireland and in Scotland

*those with previously diagnosed HIV infection are excluded

n=number of MSM who accepted voluntary confidential testing (VCT)
N=total number of MSM included in the unlinked anonymous GUM survey

Key
E,W&NI = England, Wales and Northern Ireland
GUM = Genito-urinary medicine clinic
VCT = Voluntary confidential test
Table 4: Changes between 1997 and 2004 in (i) the number of HIV diagnoses, (ii) direct incidence estimates (iii) indirect incidence estimates (iv) HIV testing among MSM in the United Kingdom

<table>
<thead>
<tr>
<th>Geographic area</th>
<th>Age group (years)</th>
<th>Number of HIV diagnosis</th>
<th>Direct incidence estimates</th>
<th>Indirect incidence estimates</th>
<th>Number of VCT tests at all GUM clinics*</th>
<th>HIV testing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>STARHS (incidence per 100 person years)</td>
<td>CD4 count at diagnosis ≥700 cells/mm³</td>
<td>CD4 count at diagnosis &lt;200 cells/mm³</td>
<td>All</td>
</tr>
<tr>
<td>London</td>
<td>&lt;35</td>
<td>+0.8%</td>
<td>2.58, 2.80 (NS)</td>
<td>+82%</td>
<td>-28%</td>
<td>+84%</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>+55%</td>
<td>2.58, 4.16 (NS)</td>
<td>+74%</td>
<td>-32%</td>
<td></td>
</tr>
<tr>
<td>Elsewhere in E,W&amp;NI</td>
<td>&lt;35</td>
<td>+110%</td>
<td>2.04, 1.64 (NS)</td>
<td>+124%</td>
<td>-42%</td>
<td>+76%</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>+187%</td>
<td>1.90, 3.78 (NS)</td>
<td>+235%</td>
<td>-40%</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>All ages</td>
<td>+66%</td>
<td>na</td>
<td>+86%</td>
<td>-35%</td>
<td>+142%</td>
</tr>
</tbody>
</table>
Figure 1: Number of HIV diagnoses among MSM in the United Kingdom, by age and geographic location: 1997-2004

Source: Reports of HIV diagnoses received by end of March 2006
Figure 2: HIV incidence, as estimated by STARHS, among previously undiagnosed† MSM in the unlinked anonymous GUM survey in London and elsewhere in England, Wales and Northern Ireland*: 1997-2004

Source: Unlinked anonymous GUM surveys in England, Wales and Northern Ireland [16,17]

†Those who were aware of their HIV status, including men on HAART and those with AIDS, were excluded from analyses.
*Data were not available for Scotland.

Key
E,W&NI = England, Wales and Northern Ireland
GUM = Genito-urinary medicine clinic
STARHS = Serological Testing Algorithm for Recent HIV Seroconversions
Does the recent increase in HIV diagnoses among men who have sex with men in the United Kingdom reflect a rise in HIV incidence or increased uptake of HIV testing?

Sarah Dougan, Jonathan Elford, Tim Chadborn, Alison Elizabeth Brown, Kirsty Roy, Gary Murphy and O Noel Gill

*Sex Transm Infect* published online November 7, 2006

Updated information and services can be found at: [http://sti.bmj.com/content/early/2006/11/07/sti.2006.021428](http://sti.bmj.com/content/early/2006/11/07/sti.2006.021428)

**These include:**

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