



MAIN STORIES THIS WEEK



[Multiresistant *Acinetobacter baumannii* in the United Kingdom](#)

[First report from the national HIV drug resistance database](#)

[Consensus document on the epidemiology of SARS](#)

[Health Protection Agency licenses meningitis vaccine patent](#)

REPORTS BY INFECTION



Immunisation

[Surveillance of viral infections in donated blood: England and Wales, 2002](#)

[Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales](#)

[Invasive meningococcal infections, England and Wales, laboratory reports: weeks 25-28/03](#)





HIV/STIs

[HIV drug resistance in the United Kingdom](#)

[AIDS and HIV infection in the United Kingdom: monthly report \(October 2003\)](#)

News

Last updated: **23 October 2003**
Next update due: **30 October 2003**

-  [Multiresistant *Acinetobacter baumannii* in the United Kingdom](#)
-  [First report from the national HIV drug resistance database](#)
-  [Consensus document on the epidemiology of SARS](#)
-  [Health Protection Agency licenses meningitis vaccine patent](#)

Multiresistant *Acinetobacter baumannii* in the United Kingdom

An epidemic strain of multi-drug resistant *Acinetobacter baumannii* emerged in the UK in early 2000 (1). In addition to this epidemic strain, there are several other multi-resistant strains of *Acinetobacter* circulating in the United Kingdom (UK) that are being isolated from patients with bacteraemia, pneumonia, and wound infections. There is a possibility that one such strain of multi-drug resistant *A. baumannii* may be linked to patients transferred from Iraq.


Infection control teams should be aware of the possibility of patients returning from hospitals abroad, including Iraq, harbouring multi-drug resistant organisms, and institute appropriate precautionary measures to prevent spread.

If microbiologists and infection control staff have been aware of, or have investigated, such cases in their hospital, they should contact the Health Protection Agency Communicable Disease Surveillance Centre (CDSC) (telephone Mandy Walsh on 020 8200 6868 ext 4483) so that the extent of any problem can be established, and individual assessments can be made of the need to review existing local infection control guidance.

In addition, if you have stored isolates of multi-resistant *A. baumannii* **either** from patients known to have returned from Iraq, **or** from patients on a ward where there have been Iraq returnees since early March 2003, they should be sent to the Laboratory of Healthcare Associated Infection for typing. Please contact Ty Pitt (020 8200 4400 ext 4224) or Polly Kaufmann (ext 4205) for further information.

Please indicate on the forms any local antimicrobial susceptibility results and the methods used to measure these. Reactions to carbapenems and aminoglycosides such as gentamicin, tobramycin, netilmicin and amikacin, which can be variable and/or difficult to detect, are of particular interest.

References

1. Health Protection Agency. A prevalent strain of *Acinetobacter baumannii*. *Commun Dis Rep CDR Weekly* 2003; **13**(29): news. Available at <<http://www.hpa.org.uk/cdr/PDFfiles/2003/cdr2903.pdf>>. 



First report from the national HIV drug resistance database

The first report from the national HIV drug resistance database is published in this edition of *CDR Weekly* (Volume 13, number 43). This database was established to monitor, assess the impact, and help in the understanding of the determinants of HIV antiretroviral drug resistance. It represents a broad collaboration between HIV clinics, virology laboratories, academic centres, and the Health Protection Agency. It is based at the Medical Research Council Clinical Trials Unit.

Data from treated patients show a high prevalence of resistance. Since resistance testing can only be undertaken in those with detectable levels of virus in plasma, it is a measure of the characteristics of resistance in this group alone, and does not reflect the situation for all treated patients, most of whom will have successful viral suppression (undetectable viral load).

It should be noted that the data for 2002 are incomplete and may be biased. The reported rise in the prevalence of resistance in drug naive patients in 2002/3, reflecting transmission of drug resistance, should therefore be interpreted with caution until reporting of data from all centres is complete for this period.



Consensus document on the epidemiology of SARS


The World Health Organization (WHO) has issued a consensus document on SARS (1). The 35 page report summarizes the international research on the epidemiology of the SARS outbreak, representing the views of experts in public health, epidemiology, and clinical virology. It uses experiences from the main outbreak sites including published and unpublished documents and information from the weekly teleconferences of the WHO ad hoc working group on the epidemiology of SARS.

Some of the main conclusions from the report include:

- There is no evidence that SARS is an airborne disease
- Healthcare workers were at special risk
- The risk of transmission is greatest at around day ten of illness
- There is no evidence that patients transmit infection ten days after fever has resolved
- Children are rarely affected by SARS

This report was released at the start of four consecutive SARS meetings hosted by WHO in Geneva. The meetings will concentrate on the priorities for scientific research, laboratory issues, clinical treatment protocols, and prospects for vaccine development.

References

1. Severe Acute Respiratory Syndrome (SARS) Epidemiology Working Group. *Consensus document on the epidemiology of severe acute respiratory syndrome (SARS)*. Geneva: World Health Organization, 2003. Available at <http://www.who.int/csr/sars/en/WHOconsensus.pdf>. 

Health Protection Agency licenses meningitis vaccine patent




The Health Protection Agency (HPA) has successfully concluded a deal in which it has licensed the rights to a patent for the manufacture of a multi-component meningitis B vaccine to Chiron Vaccines. This fulfils a strategic goal of the Agency to develop its intellectual assets in partnership with industry in order to benefit health protection in the United Kingdom (UK).

The deal provides Chiron with an exclusive royalty-bearing licence, while enabling the HPA to continue its research and development activities in the field. In return, Chiron will pay the HPA a signing-on fee, with other terms of the agreement including milestone payments for product development through to market, and a royalty income from any commercial sale of vaccine.

Currently there are no vaccines available for the prevention of disease caused by the serogroup B strains of *Neisseria meningitidis* that are responsible for 80% of all meningococcal disease in UK (and between 45% and 80% of cases in Europe, and 32% the United States). In contrast, recently developed vaccines against serogroup C have proved to be very successful in reducing the incidence of this serious disease in recent years. The HPA is actively developing new candidate vaccines to protect against meningococcal disease and the techniques required for their assessment.

Immunisation

Last updated: **23 October 2003**
Next update due: **27 November 2003**

- 
[Surveillance of viral infections in donated blood: England and Wales, 2002](#)
- 
[Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales](#)
- 
[Invasive meningococcal infections, England and Wales, laboratory reports: weeks 25-28/03](#)

Surveillance of viral infections in donated blood: England and Wales, 2002

Donated blood is collected from volunteer (unpaid) adult donors who do not acknowledge any medical conditions, travel history, or behaviours, that are known to be associated with an increased risk of blood-borne infections. In 2002, all donations were tested for hepatitis B virus surface antigen (HBsAg), hepatitis C virus antibodies (anti-HCV), HIV antibodies (anti-HIV), and treponemal antibodies, along with nucleic acid testing for HCV RNA (on pools of donations followed by resolution of positive pools to identify individual positive donations). Additionally, testing for anti-human T-lymphotrophic virus (HTLV) I and II using donation pools constructed for HCV RNA testing began in August 2002. Donations are released to the blood supply only if none of these markers of infection are detected and if found negative for HCV RNA by nucleic acid testing.

Donors who have any markers of infection detected by any method are informed of their infection, are told to stop donating blood, and are referred to appropriate services for further care. Repeat blood donors have attended to donate blood previously, but their previous donations may not have been tested for some of these markers

A total of 296 (11.8 per 100,000 donations) of 2,497,153 donations collected by the English and Welsh blood services during 2002 had markers of viral infections (including three anti-HCV negative HCV NAT positives) (table1). Of these 296 infected donations, 135 (45%) were positive for anti-HCV and/or HCV RNA, 106 (36%) were positive for HBsAg, 23 (6%) were positive for anti-HIV, and 32 were positive for anti-HTLV. The three anti-HCV negative, HCV RNA positive donations detected during 2002 were collected from donors with recent infection who subsequently seroconverted for anti-HCV. All three were repeat donors.

New donors contributed 10% of all blood donations, but 70% of infected donations. For HTLV, however, the majority (94%) of infections were among repeat donors – although none of these had been previously tested for HTLV. As HTLV testing of all donations continues, it is expected that the number of infections identified each year will fall as infected donors are removed from the donor population.

Blood donations have been tested for anti-HIV since 1985 and for anti-HCV since 1991. The annual rates of these two markers in donations of blood from new and repeat blood donors are shown in figures 1 and 2.

Table 1 Infections detected in blood donations collected in England and Wales during 2002

Donations with confirmed marker of infection	Infections in blood donations				Any of these three markers ^{3†}
	HBV	HCV	HIV	HTLV	

	(HBsAg)	(anti-HCV/HCV RNA)*	(anti-HIV)	(anti-HTLV)	
All donations	106	135	23	32	296
- per 100,000 donations tested	4.24	5.41	0.92	3.11	11.85
- 1 in x donations	23,558	18,497	108,572	32,196	8436
Donations from new donors	89	107	10	2	208
- per 100,000 donations tested	34.77	41.81	3.91	1.96	81.27
- 1 in x donations	2876	2392	25,594	51,015	1230
Donations from repeat donors‡	17	28	13	30	88
- per 100,000 donations tested	0.76	1.25	0.58	3.23	3.93
- 1 in x donations	131,836	80,043	172,401	30,941	25,468

* Including two anti-HCV negative donors positive for HCV RNA by nucleic acid testing.

† Two donors had markers of two infections: HBsAg and anti-HCV; anti-HIV and anti-HCV.

‡ Includes donations from repeat donors newly tested for markers of infection.

Figure 1 HIV infected blood donations: England and Wales Donations collected from 1/10/85 to 31/12/2002

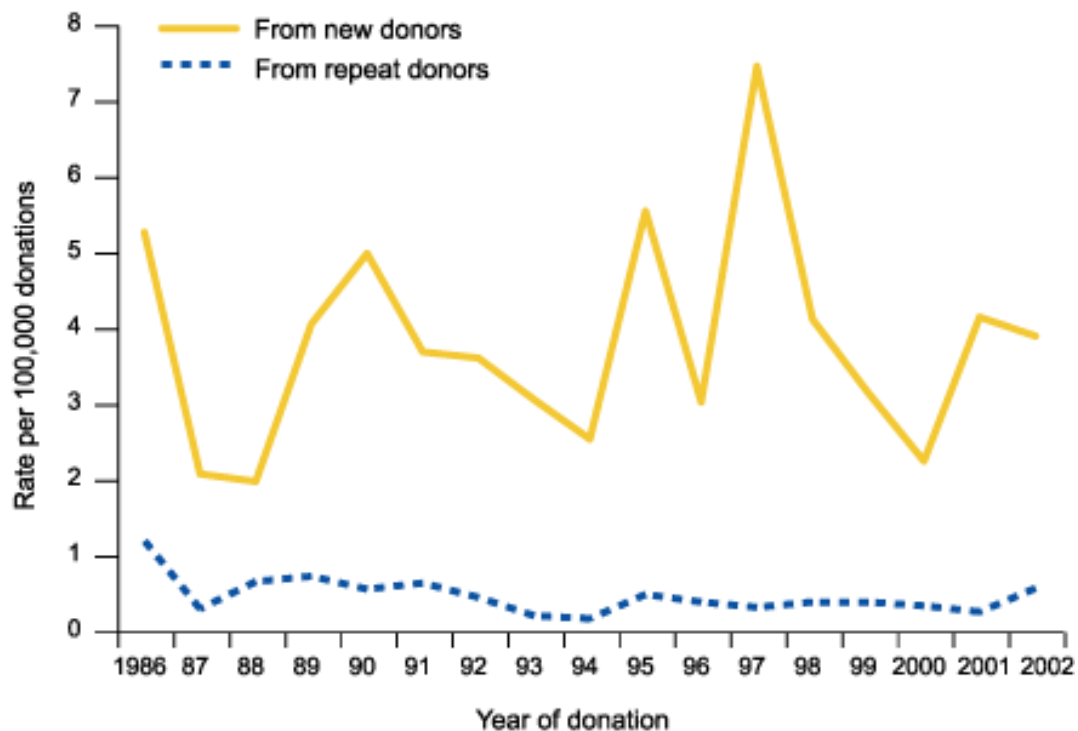


Figure 2 HCV infected blood donations: England and Wales Donations collected from 1/9/91 to 31/12/2002

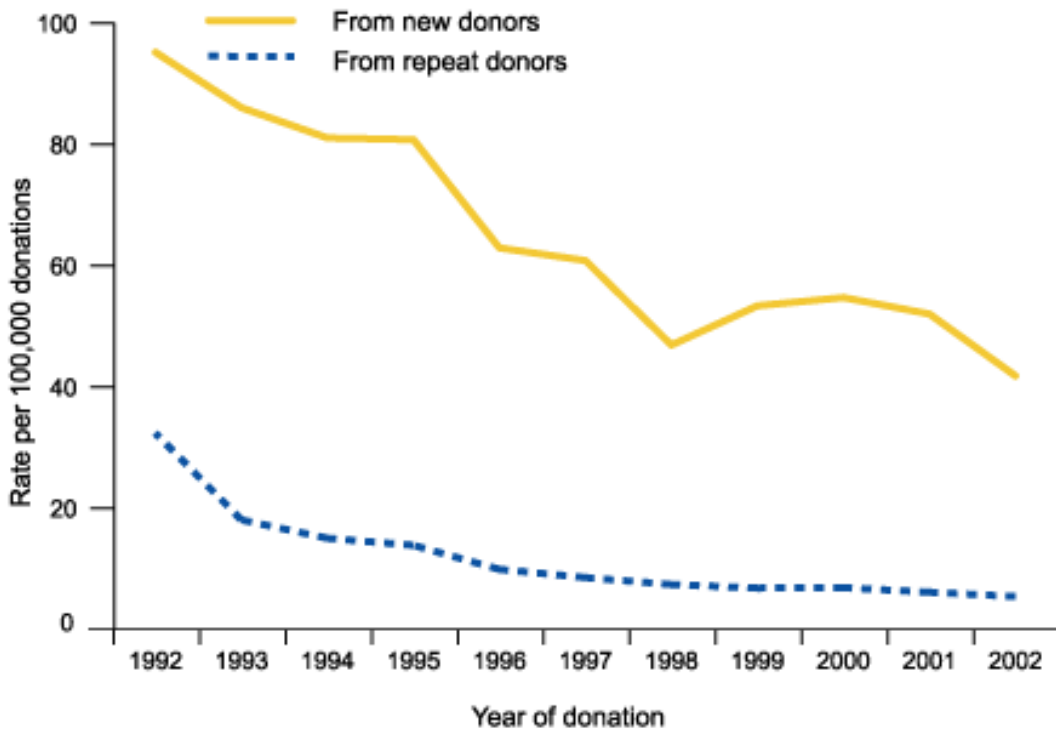
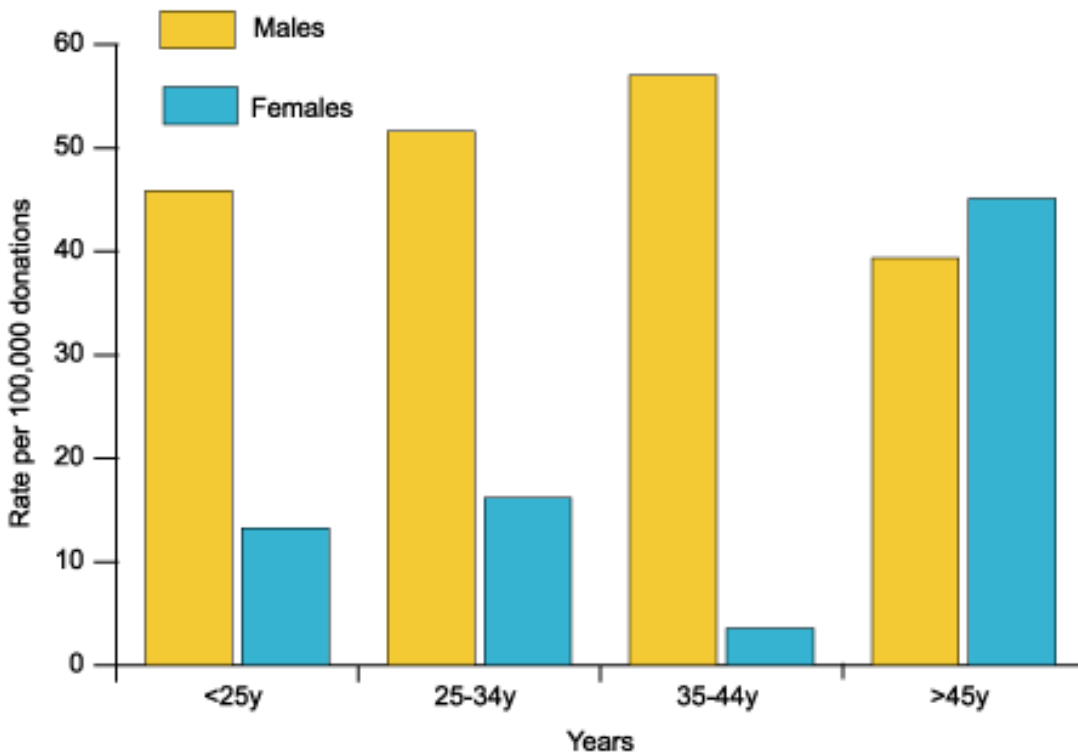
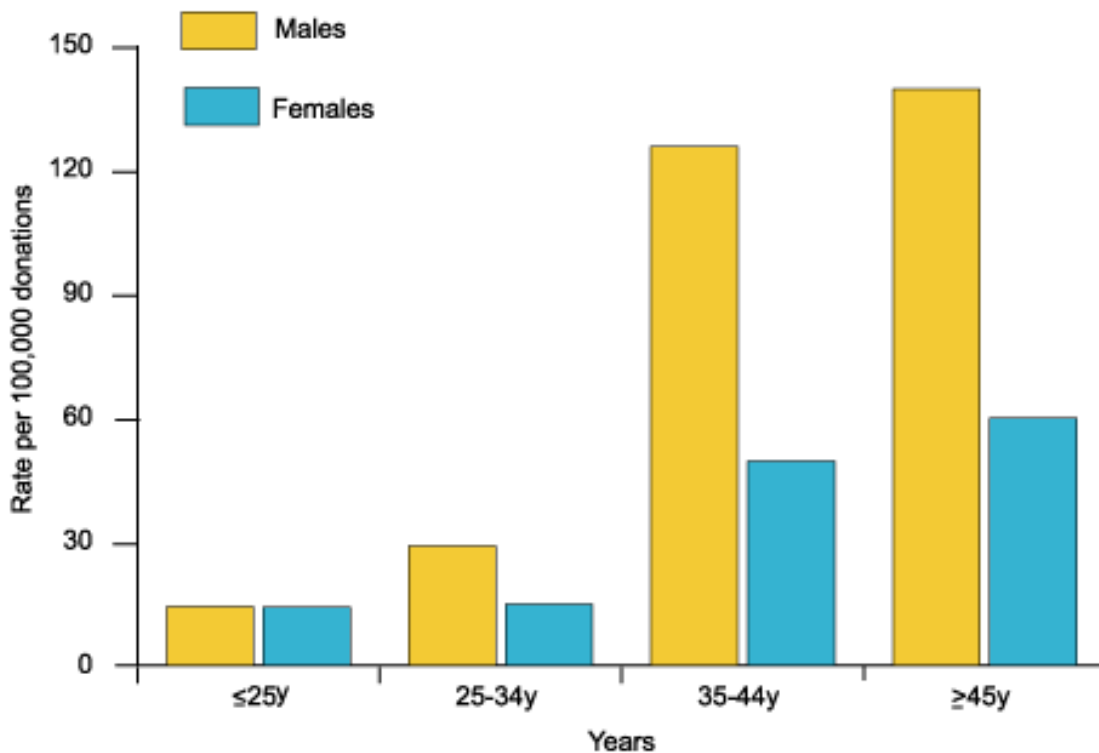


Figure 3 Age and sex of infected blood donors: newly tested donors* Donations collected during 2002

a) HBsAg



b) Anti-HCV



1 Rates adjusted for underreporting by multiplying the denominator estimate for each age and sex group by the proportion of all detected infections for which age and sex information has been reported.



The annual prevalence of HBsAg, anti-HCV and anti-HIV amongst blood donors in England and Wales have been generally stable in recent years, and low compared to the rest of Europe. The prevalence of anti-HCV has decreased throughout the 1990s. The prevalence of HBsAg and of anti-HCV by age group and sex of donors is shown in figure 3.

Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales

Table Laboratory Reports of *Haemophilus influenzae* by age group and serotype, England and Wales 3rd Quarter 2003 (2002)

	Age (years)					total
	≤1 year	1-5 years	5-14 years	≥15 years	not known	
b	2(4)	15(23)	7(3)	17(12)	1(-)	42(42)
nc	3(4)	3(3)	5(-)	27(26)	- (1)	38(34)
a,e,f	-(-)	- (1)	-(-)	- (2)	3(-)	3(3)
not typed	2(-)	2(-)	2(3)	37(32)	- (1)	43(36)
Total	7(8)	20(27)	14(6)	81(72)	4(2)	126(115)

**Invasive meningococcal infections, England and Wales, laboratory reports: weeks 25-28/03**

	Method of diagnosis			Total reports 25-28/2003	cumulative*total to week 20/2003
	CSF and blood culture	non- culture	other sites culture		
Group A	1	–	–	1	1
B	42	27	5	74	752
C	3	1	–	4	72
W135	–	–	–	–	21
X	–	–	–	–	2
Y	–	–	–	–	8
Z	–	–	–	–	–
29E	–	–	–	–	–
Ungroupable	–	–	2	2	2
Ungrouped	–	8	–	8	53
Total	46	36	7	89	911

* Combined CDSC data and Meningococcal Reference Unit data latex antigen, microscopy, polymerase chain reaction

HIV / STIs

Last updated: 23 October 2003
Next update due: 27 November 2003



[HIV drug resistance in the United Kingdom](#)



[AIDS and HIV infection in the United Kingdom: monthly report \(October 2003\)](#)



HIV drug resistance in the United Kingdom

Data provided by UK HIV Drug Resistance Database, Health Protection Agency (HPA) Antiviral Susceptibility Reference Unit, UK Collaborative HIV Cohort (CHIC), and the HPA's Communicable Disease Surveillance Centre, Colindale.

This report represents the first output of the national HIV Resistance Database, which was established in 2001. The purpose is to estimate the prevalence and characteristics of drug resistance within drug experienced* patients in whom therapy is not effective, and b) the prevalence and characteristics of transmitted drug resistance (assessed via drug naive patients†). All major clinical centres and/or virology laboratories providing resistance testing for patients in the United Kingdom (UK) (*ie*, England, Scotland, Wales, and Northern Ireland) are represented within the database. Data are stored as amino acid sequences allied, as far as possible, to clinical data, including antiretroviral drug history. For six of the largest HIV clinical centres, resistance data are matched to clinical data provided within the UK Collaborative HIV Cohort (CHIC). Where available, more limited clinical data were also obtained from the resistance test request form that accompanied the plasma sample.

Background to HIV resistance testing

Genotypic and phenotypic methods are available for assessing HIV drug resistance. Since phenotypic testing is expensive, and not routinely undertaken outside commercial organisations, most data are generated from genotypic methods. These involve the sequencing of the reverse transcriptase and protease genes of plasma virus from patients. Such tests can only be undertaken if the level of virus (the viral load) is sufficient for analysis. It follows that resistance testing cannot be undertaken in those patients in whom therapy is effectively suppressing virus replication. Results of genotypic testing are interpreted through identification of one or more mutations recognised to confer reduced drug susceptibility. More than 200 such mutations have been identified, and these interpretations are regularly updated. In general, drug resistance data are expressed as predicted susceptibility to individual drugs, or resistance to classes of drugs. It should be appreciated that specific individual mutations confer resistance to one or more drugs within a class, but not to more than one class.

Currently, three classes of antiretroviral drugs are licensed, the nucleoside/nucleotide reverse transcriptase inhibitors (NRTI), non-nucleoside reverse transcriptase inhibitors (nNRTI), and protease inhibitors (PI). The first drug (enfuvirtide) within a fourth class, the fusion inhibitors, is likely to be approved in early 2004. For simplicity, data are presented within this report in terms of the number of classes of drugs which are compromised by resistance. It is important, however, to note that this is not absolute, and that some mutations may confer resistance to only one drug within a class. The data may, therefore, overestimate the breadth of resistance

Resistance mutation interpretation systems allow mutational data to be described in terms of drug susceptibility, and have been developed to guide treatment in patients on a failing drug regimen. By contrast, these algorithms may be of less relevance for purposes of surveillance, particularly for transmission of drug resistance (in drug naive individuals). For instance, some mutations (often called “secondary”) may contribute to reduced drug susceptibility only in the presence of key mutations (often called “primary”). In patients treated with anti-retroviral therapy, these mutations often co-exist. Some secondary mutations, however, may be present alone as a natural variant in a minority of drug naive individuals and do not necessarily reflect transmitted resistance. Care should be taken to not over-interpret the absolute prevalences of transmitted resistance described in this report. Following convention, we define resistance as - one or more mutations within a list based on the International AIDS Society-USA guidelines‡.

Results

The analysis includes 2025 resistance tests on drug naïve patients (including 152 with recent infection)§ and 4577 tests on drug experienced patients . The drug naive analysis is based on one (test per patient; for the drug experienced analysis, one test per year was included (on a total of 3354 patients). Temporal trends are described according to yearly time intervals. Test numbers are increasing year-by-year, but data for 2002 and 2003 are incomplete because of reporting delay. Table 1 shows demographic characteristics of the study population.

Table 1 Demographics of drug naïve and drug experienced patients within database

	Naive	Experienced
Number of subjects	2025	3354
Sex:		
Male	1410 (70)	1935 (58)
Female	217 (11)	362 (11)
Unknown	398 (20)	1057 (32)
Age at time of sample (n) <age> median [IQR]:	(2005) <34.5> [30.1-40.0]	(3314) <37.9> [33.5-43.5]
Ethnicity:		
White	1062 (52)	1432 (43)
Black Caribbean	52 (3)	49 (2)
Black African	218 (11)	395 (12)
Black Other	29 (1)	53 (2)
Indian/Pakistani/Bangladeshi	14 (0.7)	11 (0.3)
Other Asian/Oriental	9 (0.4)	17 (0.5)
Other/Mixed	44 (2)	104 (3)
Unknown/Not reported	597 (29)	1293 (39)
Exposure:		
Homo/bisexual	1140 (56)	1559 (46)
IDU	52 (3)	76 (2)
Heterosexual	318 (16)	539 (16)
Blood products	4 (0.2)	23 (1)
Other/Unknown	511 (25)	1157 (34)

Drug Experienced

Clinical requests for HIV resistance testing in patients treated with anti-retroviral therapy are usually made following virus rebound or during lack of virus suppression. Testing cannot be undertaken in those with virus suppression, since plasma viral load is too low for PCR amplification, and sequencing of the viral genes. The data presented do not represent all treated patients, but rather those with virological failure.

Since 1996, the prevalence of any resistance in drug experienced patients with detectable viral load has remained approximately constant (approximately between 70% and 80%). The fact that this does not reach 100% probably reflects sub-optimal drug adherence/plasma drug levels in some patients, leading to minimal drug selective pressure with wild type virus preferentially replicating in the absence of the drugs. Resistance to NRTIs also remains relatively unchanged over time. This is not surprising since standard therapy regimens have included two drugs within this class since the introduction of highly active antiretroviral therapy (HAART) in 1996. PIs became widely used as the third component of first line therapy in 1996/7 until 1999/2000, at which time the nNRTIs started to become the class of choice for initiation of therapy. Of interest, this shift in prescribing pattern is reflected in the changing resistance patterns to PIs and nNRTIs over this period (table 2, fig 1). The degree to which therapy is compromised by resistance can be expressed as the number of classes of drug to which the virus is resistant. Since 1999, more than 10% of patients failing on therapy have had resistance to all three classes of drugs (table 3, fig 2).

Table 2 Prevalence and characteristics of HIV drug resistance in drug experienced patients by calendar year

ART class	1996-7 (n=186) n(%)	1998 (n=438) n(%)	1999 (n=921) n(%)	2000 (n=953) n(%)	2001 (n=1136) n(%)	2002-3 (n=943) n(%)	Total (n=4577) n(%)
NRTI	117 (63)	300 (68)	689 (75)	634 (67)	782 (69)	674 (72)	3196 (70)
PI	21 (11)	144 (33)	321 (35)	275 (29)	323 (28)	245 (26)	1329 (29)
nNRTI	13 (7)	109 (25)	335 (36)	402 (42)	536 (47)	477 (51)	1872 (41)
Any class	120 (65)	325 (74)	751 (82)	714 (75)	884 (78)	747 (79)	3541 (77)

Table 3 Prevalence of HIV drug resistance in drug experienced patients by calendar year, categorised by numbers of antiretroviral classes compromised

No. of classes	1996-7 (n=186)n(%)	1998 (n=438)n(%)	1999 (n=921)n(%)	2000 (n=953)n(%)	2001 (n=1136)n(%)	2002-3 (n=943)n(%)	Total (n=4577)n(%)
None	66 (35)	113 (26)	170 (19)	239 (25)	252 (22)	196 (21)	1036 (23)
One	91 (50)	135 (31)	278 (30)	232 (24)	281 (25)	222 (24)	1239 (27)
Two	27 (15)	152 (35)	352 (38)	367 (39)	449 (40)	401 (43)	1748 (38)
Three	2 (1)	38 (9)	121 (13)	115 (12)	154 (14)	124 (13)	554 (12)

Figure 1 Prevalence and characteristics of HIV drug resistance in drug experienced patients by calendar year

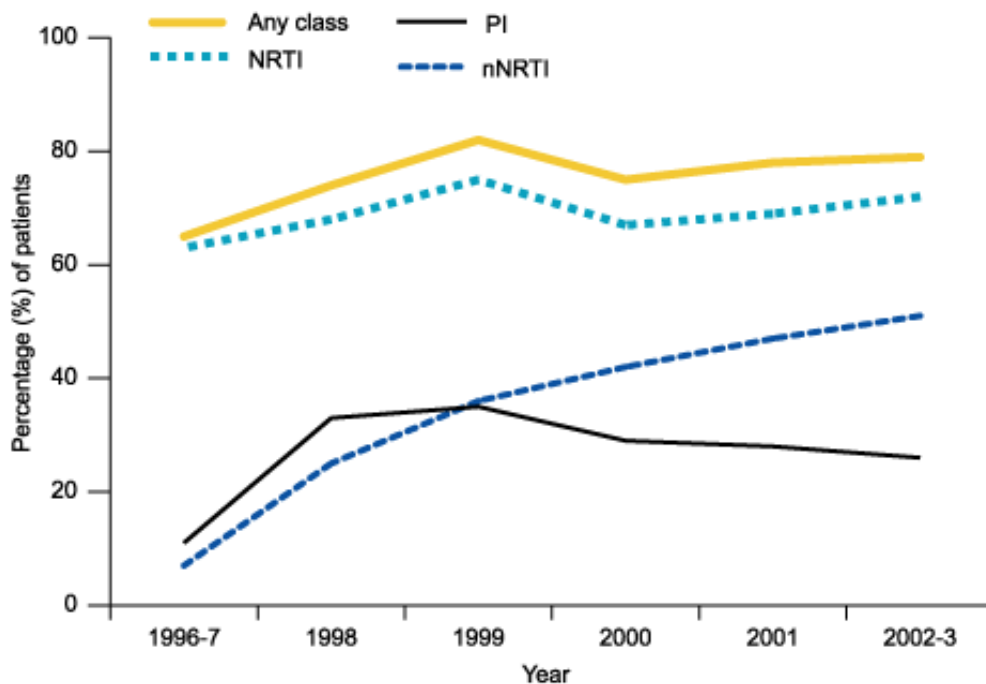
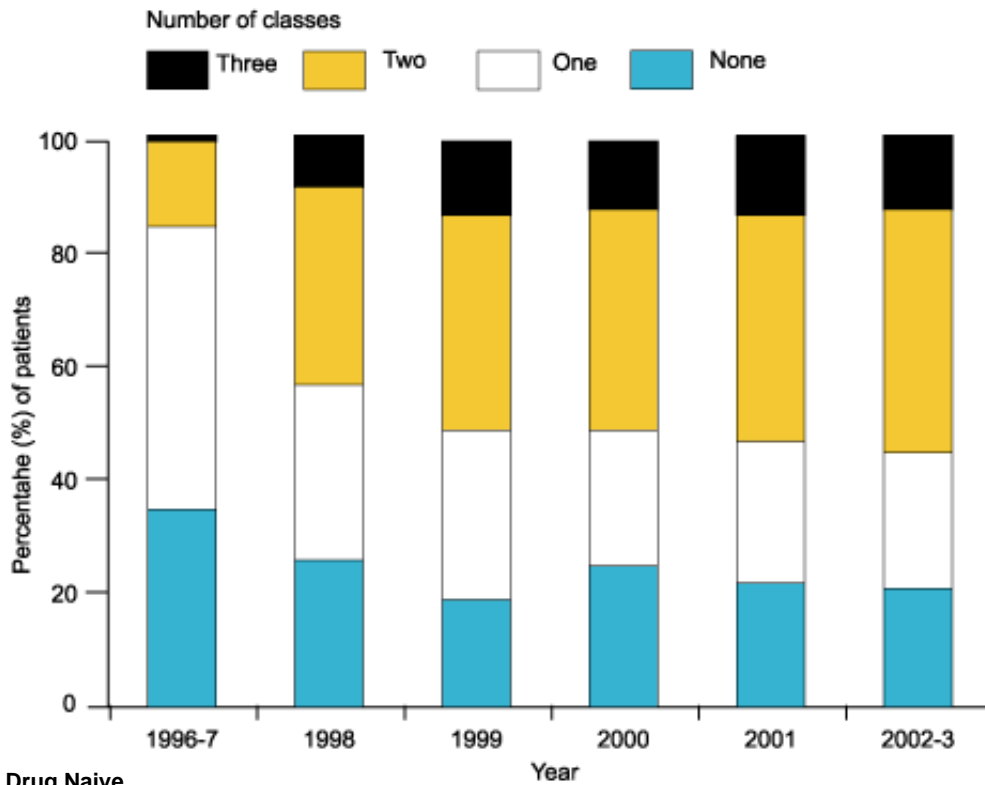


Figure 2 Prevalence of HIV drug resistance in drug experienced patients by calendar year, categorised by numbers of antiretroviral classes compromised



Drug Naive

The presence of drug resistant virus in drug naive individuals implies transmission of resistance, since *de novo* mutation in the absence of drug pressure is thought extremely unlikely. During the period assessed, testing for drug resistance in drug naive patients was not routine practice. This sample is unlikely to be fully representative of those starting treatment for the first time in the UK. The reasons for testing include suspicion of transmitted resistance, pregnancy (where short term response to therapy is essential), patient request, therapeutic trials in acute infection, and routine policy in some centres. In addition, patients conforming to the criteria of the UK Register of HIV Seroconverters† were offered testing free of charge by the HPA Antiviral Susceptibility Reference Unit, Birmingham.

There has been a year-on-year increase in prevalence of any resistance in drug naive individuals, reaching 21% between 2002 and 2003 (table 4, fig 3). This trend is driven by NRTI and, more recently nNRTI resistance; PI resistance has remained at a low level throughout the study (table 4, fig 3). In contrast to treated patients, most of those with resistance mutations had resistance to only one drug class (table 5, fig 4).

Table 4 Prevalence and characteristics of HIV drug resistance in drug naive patients by calendar year

ART class	1996-7 (n=310) n(%)	1998 (n=306) n(%)	1999 (n=342) n(%)	2000 (n=430) n(%)	2001 (n=476) n(%)	2002-3 (n=161) n(%)	Total (n=2025) n(%)
NRTI	28 (9)	23 (8)	32 (9)	51 (12)	57 (12)	25 (16)	216 (11)
PI	3 (1)	7 (2)	7 (2)	13 (3)	15 (3)	5 (3)	50 (3)
nNRTI	4 (1)	4 (1)	11 (3)	17 (4)	17 (4)	12 (8)	65 (3)
Any class	32 (10)	27 (9)	38 (11)	70 (16)	68 (14)	34 (21)	269 (13)

Table 5 Prevalence of HIV drug resistance in drug naive patients by calendar year, categorised by numbers of antiretroviral classes compromised

No. of classes	1996-7 (n=310) n(%)	1998 (n=306) n(%)	1999 (n=342) n(%)	2000 (n=430) n(%)	2001 (n=476) n(%)	2002-3 (n=161) n(%)	Total (n=2025) n(%)
None	278 (90)	279 (91)	304 (89)	360 (84)	408 (86)	127 (79)	1756 (87)
One	29 (9)	22 (7)	28 (8)	62 (14)	52 (11)	28 (17)	221 (11)
Two	3 (1)	3 (1)	8 (2)	5 (1)	11 (2)	4 (3)	34 (2)
Three	– (–)	2 (1)	2 (1)	3 (1)	5 (1)	2 (1)	14 (1)

Figure 3 Prevalence and characteristics of HIV drug resistance in drug naive patients by calendar year

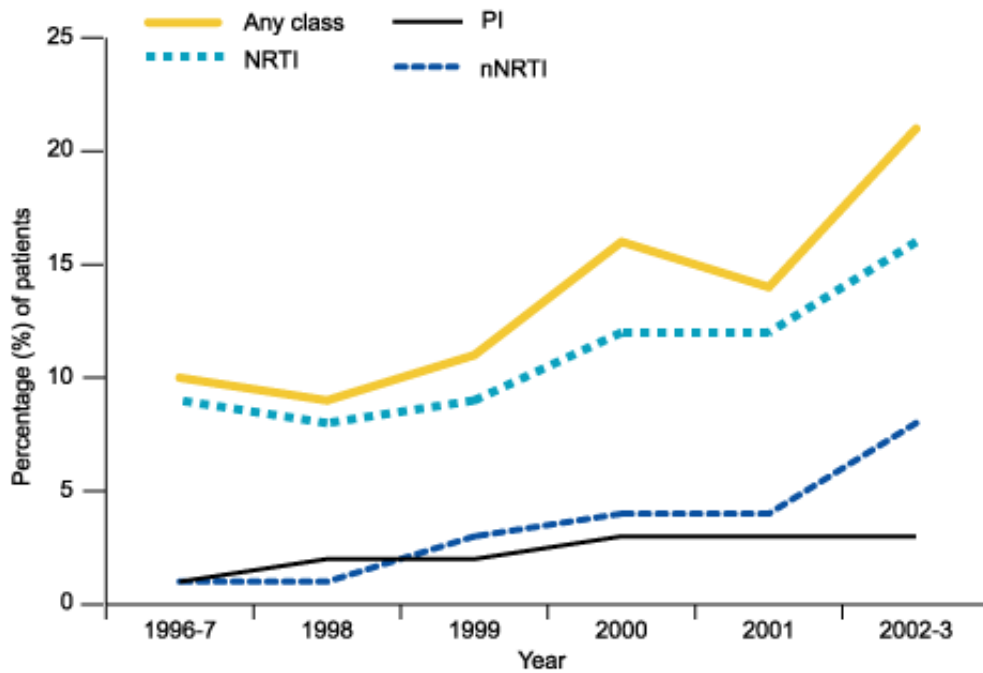
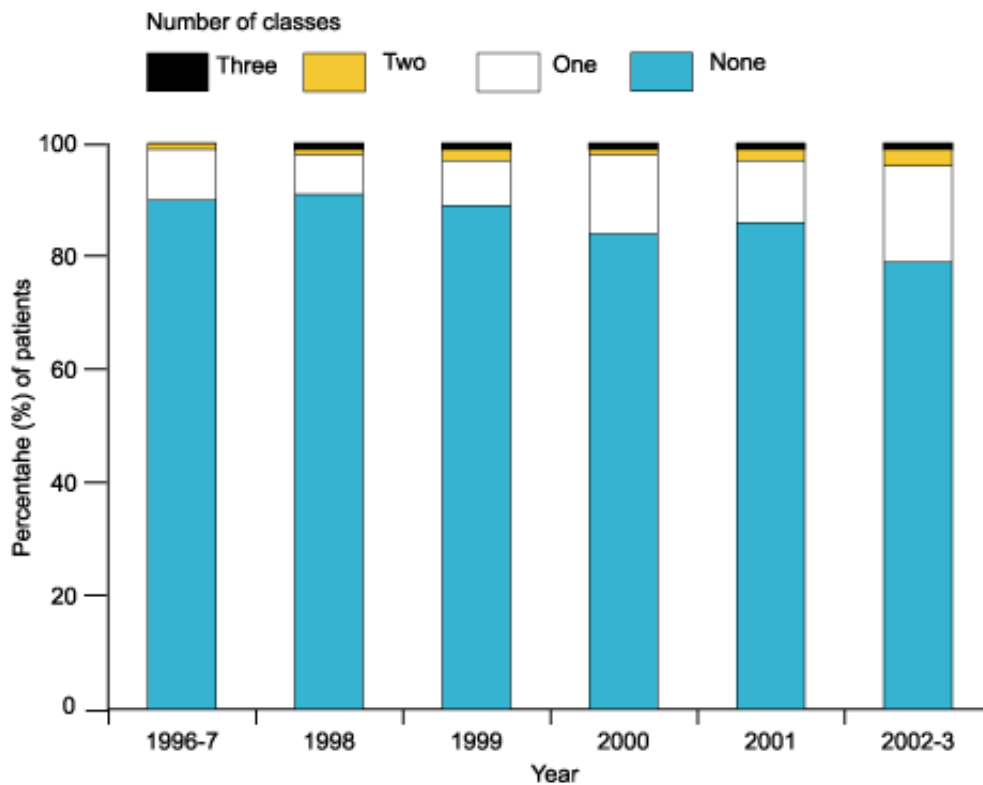


Figure 4 Prevalence of HIV drug resistance in drug naive patients by calendar year, categorised by numbers of antiretroviral classes compromised



Of the 225 drug naive individuals, 152 had evidence of recent infection[§]. The prevalence of any resistance in these 152 individuals over the three time periods – from 1996 to 1998, 1999 to 2000, and 2001 to 2003 were 16%, 20%, and 24% respectively, which confirms the trend previously identified in a subset of these data (2). The corresponding prevalence for drug naive individuals, excluding these recent infections (1873 individuals), were lower, at 9%, 13%, and 15% respectively.

Conclusions

HIV drug resistance is widespread in patients receiving treatment who are experiencing virological failure. This is not surprising, and reflects the remarkable ability of the virus to escape drug selective pressures. Over 10% of such patients appear to be resistant to drugs within all three currently licensed classes. The relative increase in nNRTI resistance over PI resistance in the late 1990s probably reflects changing prescribing practice over that period of time. These data must be set in the context of the increasing success of antiretroviral therapy in maintaining viral suppression (UK CHIC, unpublished data), such that a decreasing proportion of treated individuals starting therapy are experiencing therapy failure (and therefore drug resistance). There is, however, an urgent requirement for new classes of drugs in order to effectively treat those who do have drug resistance. The likely approval of enfuvirtide (a fusion inhibitor) in 2004, which has activity against such viruses, is of note.

Since we present data acquired through resistance testing for clinical purposes, the individuals tested may not be representative of the

population as a whole, particularly in the case of drug naïve patients. Different rates of testing according to clinical centre and risk group, for example, will be evident, thus leading to a potential bias in the general interpretation of our results. Another potential bias is incomplete or inaccurate ascertainment of ART history which would alter the prevalence of transmitted drug resistance. This must be taken into account when interpreting the information provided in this report.

Of major public health concern is that new diagnoses of HIV infection continue to rise(3).The data presented on resistance in drug naïve individuals suggest that one small but important source of these new infections are patients already receiving therapy. Safe sex messages targeted at HIV infected individuals require reinforcement. Since response to therapy is blunted in those infected with resistant virus (4,5) this phenomenon may compromise the hitherto great success of HAART. There is a trend for those recently infected to have a higher prevalence of resistance compared to the drug naïve population, for whom the time of infection is less clear. Further work is required to explore reasons for this difference, such as reflecting a temporal phenomenon, or that the drug naïve and acute infection cohorts represent different risk groups.

Footnotes

*Have received or are receiving anti-retroviral therapy.

†Have not received anti-retroviral therapy.

‡ "Modified IAS": The following mutations were used to identify resistance to each class of drugs. Those mutations not represented in the IAS-USA list (1) are underlined. **Nucleoside/nucleotide RT inhibitors:** 44L, 44D, 62V, 65R, 69D/N, 69 insertions, 70R, 74V, 75I, 77L, 115F, 116Y, 118I, 151M, 184V/I, 210W, 215 any, 219E/Q; **Non nucleoside RT inhibitors:** 100I, 103N, 106A/M, 108I, 181C/I, 188C/L/H, 190 any, 225H, 230L, 236L; **Protease inhibitors:** 30N, 46I/L, 48V, 50I/V, 53L, 54L/V, 82A/F/S/T, 84V, 90M.

§ Criteria for UK Register of HIV Seroconverters: Patients with resistance tests conform to the following criteria: evolving HIV-1 antibody response, or a negative HIV-1 antibody test within previous 18 months.

Acknowledgments

UK HIV Drug Resistance Database Steering Committee, CHIC Steering Committee, Funding agencies (DH, HPA, MRC, NHS Responsive Funding Group).

References

1. D'Aquila RT, Shapiro JM, Brun-Vezinet F, et al. Drug resistance mutations in HIV-1. *Top HIV Med* 2003; **11**(3): 92-6.
2. UK Collaborative Group on Monitoring the Transmission of HIV Drug Resistance. Analysis of prevalence of HIV-1 drug resistance in primary infections in the UK. *Brit Med J* 2001; **322**:1087-8.
3. Health Protection Agency. Latest SOPHID data show a 20% increase in the annual numbers seen for HIV-related care. *Commun Dis Rep CDR Wkly* [serial online] 2003 [cited 22 October]; **13**(38): HIV/STIs. Available at <http://www.hpa.org.uk/cdr/PDFfiles/2003/cdr3803.pdf>.
4. Grant RM, Hecht FM, Warmerdam M, et al. Time trends in primary HIV-1 drug resistance among recent infected persons. *JAMA* 2002; **288**:181-8.
5. Little SJ, Holte S, Routy JP, et al. Antiretroviral-drug resistance among patients recently infected with HIV. *NEJM*, 2002; **347**: 385-94.

AIDS and HIV infection in the United Kingdom: monthly report (October 2003)

United Kingdom (UK) data from the Health Protection Agency Communicable Disease Surveillance Centre (CDSC), Scottish Centre for Infection and Environmental Health, Institute of Child Health, London.

In the third quarter of 2003, 1734 reports of new diagnoses of HIV infection in individuals were added to the United Kingdom (UK) data set. The cumulative total of new HIV diagnoses stands at 59,497 at the end of September 2003. The addition of delayed reports brings the total number of new diagnoses for 2002 to 5711. The number of reports of new HIV diagnoses in 2003 is 3572. This represents a 21 per cent increase in the number of reports received to the end of September 2003 compared to the same period in 2002.

Forty-eight per cent (2744/5711) of reports were from the London region in 2002, down from 62% (1627/2621) in 1993. Other regions with significant numbers of reports are the South East 12% (654), East of England 8% (467), and North West 7% (379) (table 1).

The total number of new diagnoses of HIV infection has doubled in the last decade rising from 2621 in 1993. The number of reports of HIV diagnoses in the East of England region for 2002 is over five times higher than in 1993, rising from 84 to 467. The number of new HIV diagnoses in the West Midlands region is more than four times greater in 2002 than 1993. The North East, Yorkshire and Humberside, and East Midlands regions have each experienced an increase of almost four times in the number of new diagnoses in the last 10 years.

Table 1 HIV infected individuals* by country, region and year of HIV diagnosis. UK data to end September 2003†

Country and region of diagnosis	1990 or earlier	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003‡
England														
North East	304	27	38	22	32	21	24	34	22	30	36	53	84	67
Yorkshire & Humberside	568	66	87	79	65	81	90	82	85	92	98	179	292	213
East Midlands	306	46	69	68	57	51	48	44	61	84	101	195	242	190
East of England	388	73	90	84	61	78	55	76	85	96	186	308	467	297
London	9960	1752	1694	1627	1583	1685	1705	1720	1762	1950	2328	2742	2744	1660
South East	1384	195	226	222	233	168	226	215	205	216	353	491	654	407
South West	551	89	85	67	108	87	77	91	104	101	103	133	171	125
West Midlands	526	84	83	82	75	98	62	98	106	101	178	209	360	122
North West	938	157	172	146	146	179	187	149	188	206	230	421	379	268
England (total)	14,925	2489	2544	2397	2360	2448	2474	2509	2618	2876	3613	4731	5393	3349
Wales	241	38	52	41	46	46	36	44	30	34	46	65	71	47
Northern Ireland	78	19	12	12	14	12	16	9	9	14	19	19	24	18
Scotland	1508	172	133	169	146	146	160	167	155	147	146	160	216	155
UK Total	16,752	2718	2741	2619	2566	2652	2686	2729	2812	3071	3824	4975	5704	3569
Channel Islands/ Isle of Man	26	2	1	2	8	1	6	8	6	1	1	7	7	3

* Individuals with laboratory reports of infection plus those with AIDS or death reports for whom no matching laboratory report has been received.

† Numbers particularly for later years will increase as further reports are received.

‡ Reported by the end of September 2003.

Route of infection

Overall, 51% (30,465/59,497) of new diagnoses were probably infected through sex between men, 34%(19,995) through sex between men and women, and 7%(4028) through injecting drug use (IDU) (table 2).

Table 2 HIV infections diagnosed* in the United Kingdom by exposure category: data to end September 2003†

How infection was probably acquired	1990 or earlier	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003‡	Total
Sex between men	11,079	1714	1640	1503	1483	1474	1546	1404	1357	1350	1499	1735	1691	990	30,465
Sex between men and women	1611	647	780	770	794	851	835	1005	1161	1429	1987	2842	3305	1978	19,995
Injecting drug use	2064	242	187	204	168	183	173	168	130	112	109	131	104	53	4028

Blood factor	1329	4	4	4	2	–	2	2	2	1	1	2	3	–	1356
Blood/tissue transfer	143	20	20	13	15	20	18	27	8	20	23	23	23	11	384
Mother to infant	81	37	58	66	65	61	62	81	94	82	102	82	100	52	1023
Other/undetermined	471	56	53	61	47	64	56	50	66	78	104	167	485	488	2246
Total	16,778	2720	2742	2621	2574	2653	2692	2737	2818	3072	3825	4982	5711	3572	59,497

* Individuals with laboratory reports of infection plus those with AIDS or death reports for whom no matching laboratory report has been received.
† Numbers particularly for later years will increase as further reports are received.
‡ Reported by the end of September 2003.

In 2002, where route of infection was known 63% (3305/5226) were probably infected through sex between men and women, 32%(1691) through sex between men, 2% (104) through IDU. Of those infected through sex between men and women 75% (2472) were probably infected in Africa. Of those infected in Africa 45% (1118/2472) are associated with infection in Zimbabwe.

For those infected through sex between men and women, the route of infection for the partner is also requested. Eighty-three per cent (2743/3305) of those infected through sex between men and women had no indication of a high-risk partner and were infected abroad, and of these 90% (2472) were infected in Africa, (table 3). Of those heterosexual infections, which probably occurred in the UK and whose partner's country of infection was known, 83% (166/199) had partners who were infected outside Europe, and 75% (145/166) of these were infected in Africa.

Table 3* HIV infected individuals† infections probably acquired through sex between men and women by year of HIV diagnosis

How HIV was probably acquired			1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003‡
Exposure to 'high risk' partner(s)	Sexual Intercourse between men		12	21	24	21	12	11	10	11	12	13	23	19	5
	Injecting drug use		38	37	37	31	41	33	49	48	23	23	37	19	11
	Blood factor treatment (eg, for haemophilia)		5	9	2	2	3	6	1	1	1	1	–	1	2
	Blood/tissue transfer (eg, transfusion)		–	3	3	–	1	3	5	3	4	1	4	2	–
Exposure to presumed heterosexually infected partner(s)	Exposure abroad §	Africa	448	524	507	532	559	549	642	747	996	1481	2177	2472	1308
		Latin America / Caribbean	12	22	24	27	14	25	29	32	62	67	84	118	49
		Asia	17	26	28	18	39	44	53	78	76	109	96	100	60
		North America	10	14	16	9	8	8	10	15	7	6	9	4	2
		Europe	24	38	38	36	42	42	50	42	49	47	46	47	21
		Australasia	1	1	2	–	2	1	2	4	6	2	5	2	1
		country(ies) not known	–	1	–	–	2	7	3	16	–	2	–	–	3
Partners exposure category undetermined	Exposure in the UK to partner(s) presumed infected	outside Europe	15	27	17	38	48	42	71	81	90	129	159	166	68
		within Europe	31	25	42	44	38	29	39	42	48	48	51	33	34
		country(ies) not known	31	29	28	30	32	28	31	25	30	25	52	91	53
Partners exposure category undetermined	investigation continuing	investigation continuing	–	1	–	2	3	3	2	11	21	30	98	227	361
		investigation closed	3	2	2	4	7	4	8	5	4	3	1	4	–
Total			647	780	770	794	851	835	1005	1161	1429	1987	2842	3305	1978

* Numbers particularly for later years will increase as further reports are received.
† Individuals with laboratory reports of infection plus those with AIDS or death reports for whom no matching laboratory report has been received.
‡ Reported by the end of September 2003.
§ Individuals from abroad and individuals from the UK who have lived or visited abroad, for whom there is no evidence of high risk partners.

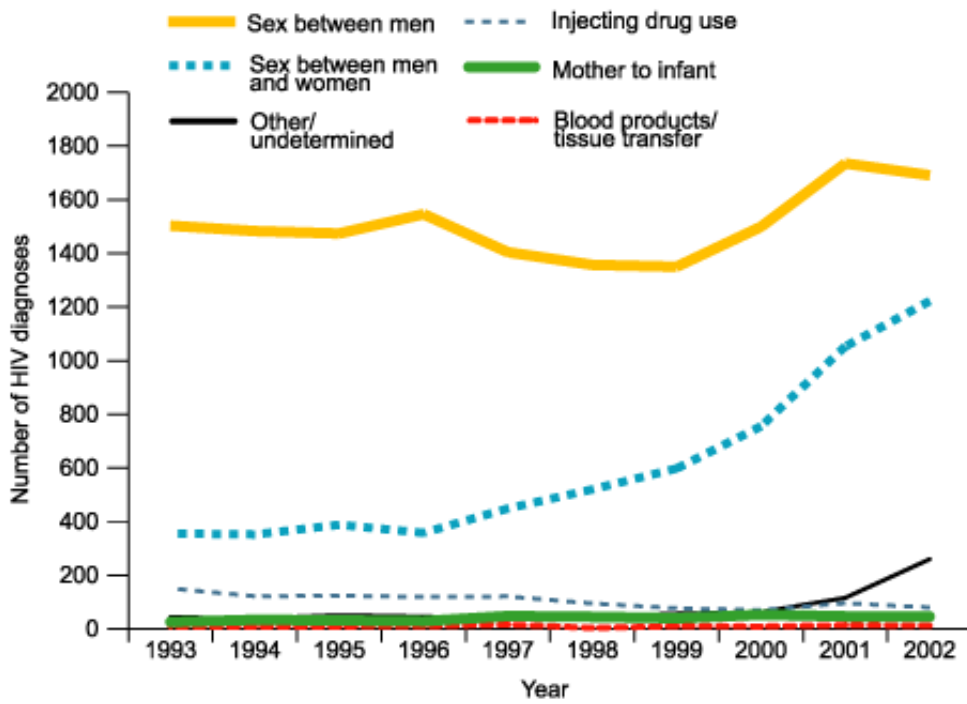
HIV diagnoses in men

Where the sex of an individual is known 76% (44,895/59,454) of the cumulative total of new diagnoses were in men. In 2002, the proportion of males newly diagnosed with HIV infection had reduced to 58%(3311/5711) from 80%(2090/2620) in 1993.

Figure 1 shows how the proportion of males who were infected through sex between men and women has increased over the years. By 2002, 40% (1222/3051) of new HIV diagnoses in men, where route of infection is known, were infected in this way. In 1993, this proportion was 17% (356/2045). The proportion of those infected through sex between men has declined from 72% (1503/2045) in 1993 to 55% (1691/3051) in

2002. Injecting drug use has declined from 7% (151/2,045) in 1993 to 3% (80/3051) in 2002.

Figure 1 HIV diagnoses in males by route of infection and year of HIV diagnosis*



* Numbers particularly for later years will increase as further reports are received.

Of the 1222 men who were infected through sex between men and women, the country of infection is known for 1142. Of these, 79% (899/1142) were infected in Africa, 10% (118) in Europe, and 5% (56) in Latin America and the Caribbean. Of the infections that occurred in Europe 82%(97/118) were infected in the UK.