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Late diagnosis of HIV in Europe: definitional and public health challenges

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Summary:

With universal access to antiretroviral therapy (ART), people can access effective treatment but are only able to benefit from these advances if they are aware of their status and are effectively accessing testing services. Although it was anticipated in the mid-1990s that the availability of ART would lead to earlier testing, this trend has not been observed in practice, with stagnant or even increasing rates of late diagnosis in Europe. Ahead of a gathering of key European stakeholders in Brussels in November 2007, we reviewed definitions of late diagnosis and approaches to surveillance of late HIV diagnosis in Europe. We found that there is no common or consistent reporting of late diagnosis across Europe and that the multiplicity of definitions for late diagnosis is likely proving a hindrance to providing information on the magnitude of the problem, determining trends, and informing understanding of reasons for changes in trends. We also show that existing evidence points to high rates of late diagnosis across Europe – between 15% and 38% of all HIV cases- and concur that trends that are increasing or at best stagnant. We identify risk factors that are associated with individuals being more likely to present late and we explore the reasons for late presentation. We reflect on the need to review surveillance and testing policies, notably in relation for population groups that are heavily represented in late presenters and make recommendations for a coherent, cross-European approach to surveillance and monitoring in order to support improvements in service provision and, ultimately, public health.

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The introduction of effective antiretroviral treatment (ART) in the mid 1990s heralded a new era in the management of HIV/AIDS, offering the potential for improved health for individuals coupled with profound public health gain for society. The incentives for HIV-seropositive individuals to know their status appeared to be substantial. However, rates of undiagnosed cases remain high in Europe having been estimated at 30% by the European Centre for Disease Prevention and Control in 2006 (ECDC, 2006). Late diagnosis of HIV can be defined as presenting for treatment for HIV at a time after it may have been beneficial to start treatment.

Late presentation is detrimental to health for individuals, resulting in increased morbidity and mortality, and for public health because of the increased potential for transmission from individuals unaware of their HIV status. It has been shown that earlier diagnosis reduces short term mortality by 56% overall and heterosexually acquired AIDS mortality by 32%,(Chadborn, Delpech, Sabin, Sinka, & Evans, 2006) and that as much as 77% of all AIDS-related deaths could be late presenters (Ciancio, Forde, Dougan, Chadborn, & Delpech, 2006). In 2007, a British HIV Association (BHIVA) mortality survey showed that the impact on death of late diagnosis was as much as 35% of HIV-related deaths in HIV infected people and 24% of total deaths in HIV infected people (BHIVA, 2006). Cohort analyses have reported that over three years, compared with a baseline CD4 of less than 50/ μ l, people initiating ART with CD4 counts of between 50/ μ l and 99/ μ l had 0.74 times the

risk of death and those who began ART with CD4 counts of 200-349/ μ l had 0.24 times the risk of death (Egger et al., 2002). Similarly, patients who began treatment with CD4 counts less than 50/ μ l had 70 deaths per 1000 person-years while those who initiated treatment with CD4 counts greater than 200 had only 3.2 deaths per 1000 person-years (Jensen-Fangel et al., 2004). Patients starting ART before their CD4 count fell below 200/ μ l had similar mortality rates to the general population not infected with HIV (Jensen-Fangel et al., 2004).

Late diagnosis also has a major public health impact. Early detection reduces transmission, because of both the adoption of changes in risk behaviour, (Lansky, Nakashima, & Jones, 2000) (Gorbach, Drumright, Daar, & Little, 2006) (Inciardi, Surratt, Kurtz, & Weaver, 2005) (Patterson, Shaw, & Semple, 2003) (Brogly, Bruneau, Lamothe, Vincelette, & Franco, 2002) as well as a reduced viral load resulting from ART and thus reduced transmission (Quinn et al., 2000) (Vernazza et al., 2000) (Cu-Uvin et al., 2000; Fiore et al., 2003; Graham et al., 2007); (Hessol et al., 2007) (Kayitenkore K, Bekan B, Rufagari J, & et al., 2006) (Porco et al., 2004) (Katz, Davis, & Findlay, 2002) Late diagnosis also has economic implications, increasing costs for health services and society (Krentz, Auld, & Gill, 2004) (Samrawickrama A et al., 2007).

The purpose of this paper is to review approaches to determining late diagnosis of HIV across Europe and to assess the scope of late diagnosis in the region and explore its underlying determinants.

METHODS

In November 2007, we conducted a search of Pubmed and Google using the search terms “late diagnosis” or “late presentation” AND “HIV” or “Human Immunodeficiency Virus”, and “Europe”. We searched for articles published after 1997 (the advent of ART). We also reviewed the references of identified articles and included in our review those relevant. We identified 63 relevant articles, 29 of which gave a definition for late presentation. Owing to the limited information in this area, we also included key studies from the US, Australia and New Zealand because they were deemed

relevant to the definitional issue and because of similarities in their experience of the HIV epidemic and their health systems. This gave us a total of 37 definitions. Rates are only presented for Europe.

Additionally in September 2007 we surveyed 33 European countries (European Union, Norway, Switzerland, Belarus, Moldavia, Russian Federation and Ukraine) and requested countries' collaborators in Public Health institutions to provide us with national data on late diagnosis. Collaborators were identified through the WHO Euro office and through the London School of Hygiene and Tropical Medicine network. Through our European survey, 24 countries responded out of 33 contacted. Out of these 24, 22 provided us with some information on late diagnoses reported and 13 provided specific data on late diagnosis indicators.

RESULTS

Definitions and Incidence of Late Diagnosis

We found that there was no standard definition of late diagnosis. Through our review we identified nine different definitions of late diagnosis, grouped thematically in three ways. These definitions are shown in [Table 1](#) and [Table 2](#).

- 1) Definitions based on time,
- 2) Definitions based on CD4 counts, and
- 3) Definitions based on clinical presentation.

Definitions based on time from HIV diagnosis to AIDS diagnosis range from one year to one month. Researchers that used baseline CD4 count as the definition ranged between 50/ μ l and 350/ μ l. The most frequent definition was a CD4 count of less than 200/ μ l. This was used in nine of 37 studies. The next most frequent definition was HIV diagnosis within 3 months of AIDS diagnosis. This definition was used in eight out of 37 studies. Although in theory all of these definitions are based on the same notion - being diagnosed with HIV when treatment should have already been initiated - there are implications beyond the clinical in differences in approach. If allocation of resources is

informed by definitions of late diagnosis, then a late diagnosis with CD4 count $<350/\mu\text{l}$, depending on the guidelines followed, may have different resource implications from when a late diagnosis is dependent on a diagnosis of AIDS. Similarly, there are apparent differences in public health consequences dependent on different definitions of late diagnoses. Our understanding of the magnitude of the challenge of late presentation and policy responses constructed to respond to that challenge may vary depending on the definition used.

We could not detect any patterns of definitions of late diagnosis by geographical region and our European survey also showed the high variability in definitions of late diagnosis between the 22 responding countries. In some cases the same researchers used different definitions in different studies. For example, in 2000, Girardi et al used the definition of presenting with HIV within three months of initial AIDS diagnosis (Girardi, Sampaolesi, Gentile, Nurra, & Ippolito, 2000). In 2004, Girardi et al used the definition of a CD4 count of less than $200/\mu\text{l}$ (Girardi et al., 2004). In 2004 Sabin et al used the definition of CD4 count less than $50/\mu\text{l}$, whilst in 2006 they defined late diagnosis as being diagnosed with HIV within six months of being diagnosed with AIDS (Sabin et al., 2004) (Chadborn, Delpech, Sabin, Sinka, & Evans, 2006).

The definition of late diagnosis will have an effect upon determinations of the incidence of late diagnosis. With definitions associated with greater immunological competence, more individuals will be included. As a result, studies in the UK that use a CD4 count below $200/\mu\text{l}$ show incidence of late diagnosis to be around 30% (Health Protection Agency, 2006). A study that used a CD4 count under $50/\mu\text{l}$ showed an incidence around 15% (Sabin et al., 2004). Incidence of late diagnosis in Europe is shown in Table 2.

Another complicating factor is the denominator used when determining late diagnosis incidence. Some studies report the number of individuals presenting late as a proportion of all individuals with HIV or AIDS, while others report individuals presenting late with the denominator being only people who have developed AIDS. In our review, we identified 25 (68%) studies that use as the denominator HIV cases. Twelve studies used AIDS cases as the denominator. See Table 1. We could detect no pattern by countries. Clearly this is an important distinction as a proportion of HIV cases may never become AIDS cases. As a result, using HIV cases as a denominator will result in a smaller percentage of individuals who are late presenters than where the denominator is AIDS cases.

Overall incidence of late presentation of HIV has been reported between 15% to 38% of all HIV cases. When the denominator is the number of AIDS cases, the overall incidence is higher, up to 53%. Results are shown from the literature review in [Table 2](#) and from our survey in [Table 3](#).

Studies show that the proportion of people diagnosed late with HIV within the total HIV population is increasing. One study from the UK showed that people had 2.4 times the odds of presenting with AIDS in 1998-1999 than in 1982-1995 (F. M. Burns, Fakoya, Copas, & French, 2001). In Italy a study shows late presentation increasing from 13.8 in 1993 to 32.5% in 2000 (Castelnuovo et al., 2003). A similar pattern has been found in late presenters in total AIDS cases. This pattern was found in Sweden, where late presentation increased from 22% in 1996 to 58% in 2002 (Brannstrom, Akerlund, Arneborn, Blaxhult, & Giesecke, 2005). In Spain, late diagnosis was shown to increase from 24% in 1994 to 35% in 1998 to 2000 (Castilla et al., 2002), in France late diagnosis increased from 15.6% before 1996 to 41.9% after 1996 (Baratin et al., 2004) whilst in Italy two studies show late diagnosis increasing from 16% in 1995 to 36.6% in 1998 (Girardi, Sampaolesi, Gentile, Nurra, & Ippolito, 2000), from 19.95% in 1996 to 50.47% in 2002 (Longo, Pezzotti, Boros, Urciuoli, & Rezza, 2005).

The proportion of people presenting late as a proportion of all HIV cases was found to be stable in one study from the UK, (Sabin et al., 2004) and was found to be decreasing in one study from France (Delpierre et al., 2007) and in the UK in men who have sex with men (MSM), from 38% in 1993 to 25% in 2002 (Chadborn et al., 2005; Easterbrook et al., 2000).

Who is at Risk of late Diagnosis

In order to address the problem of late diagnosis, it is important to understand who is at risk of presenting late and to explore the underlying causes of late presentations. Across a variety of studies, the common characteristics of late diagnosis included migrant status, being older, being heterosexual, living in low HIV prevalence areas, and being male.

In most studies migrants were at greater risk of presenting late than people born in the country of study. This pattern was found in Sweden (Brannstrom, Akerlund, Arneborn, Blaxhult, & Giesecke, 2005), the UK (Boyd et al., 2005; Sabin et al., 2004; Sullivan, Curtis, Sabin, & Johnson, 2005)

France (Delpierre et al., 2007), Spain (Castilla et al., 2002) Italy, (Girardi et al., 2004; Girardi et al., 2001; Girardi, Sampaolesi, Gentile, Nurra, & Ippolito, 2000; Longo, Pezzotti, Boros, Urciuoli, & Rezza, 2005), the United States (Hogan et al., 2001) and Australia (Hocking, Rodger, Rhodes, & Crofts, 2000; McDonald, Li, Dore, Ree, & Kaldor, 2003). Only two studies, from France, (Baratin et al., 2004; Rotily, Bentz, Pradier, Obadia, & Cavailler, 2000) found no difference in rates of late diagnosis between migrants and non-migrants. In France, co-incident AIDS and HIV diagnosis has decreased in African migrants since 2000, from 71% to 55% (Institut National de Veille Sanitaire, 2006). Reasons cited for why migrants are more likely to present late are related to either real or imagined barriers to HIV prevention and care and may also involve cultural, linguistic and socioeconomic barriers (Hamers & Downs, 2004). Individuals may also feel stigmatised more than non-migrants (F. M. Burns, Imrie, Nazroo, Johnson, & Fenton, 2007; Erwin, Morgan, Britten, Gray, & Peters, 2002; Hamers & Downs, 2004).

Burns et al. found that Africans living in the UK are more likely to get tested for HIV than non-Africans (40% of Africans versus 12-13% of non-Africans) (F. Burns et al., 2005). However, this study was unable to find a correlation between perceived risk of HIV and HIV testing. Africans living in the UK may be less likely to present for HIV testing because they do not feel that they are at risk of acquiring HIV (Barry et al., 2002; Boyd et al., 2005; Erwin, Morgan, Britten, Gray, & Peters, 2002). One study showed that 41% of Africans are likely to have an HIV test because of perceived risk compared to 72% of non-Africans (Boyd et al., 2005). Those that do suspect they are at risk are more likely to wait up to 12 months before getting HIV tests than non-Africans (Erwin, Morgan, Britten, Gray, & Peters, 2002). Africans in the UK may meet other barriers to HIV testing. As English is not the first language of many migrants, messages may not be heard, and Africans living in the UK may not fully understand what their rights to care are under the UK National Health Service (F. M. Burns, Imrie, Nazroo, Johnson, & Fenton, 2007). Some Africans may also be in the country with uncertain migrant status and may not be eligible for NHS care (Dodds, Mercey, Parry, & Johnson, 2004) (Erwin, Morgan, Britten, Gray, & Peters, 2002).

Many studies have also shown a lack of advocacy for HIV infected Africans living in the UK, (F. M. Burns, Imrie, Nazroo, Johnson, & Fenton, 2007; Dodds, Mercey, Parry, & Johnson, 2004; Erwin, Morgan, Britten, Gray, & Peters, 2002) combined with much negative publicity about UK taxpayers having to support migrants in the UK who are infected with HIV or other diseases, so-called 'health

tourists', issues that may be impacting on willingness to get tested for HIV (F. M. Burns, Imrie, Nazroo, Johnson, & Fenton, 2007).

Fear is another factor influencing why many Africans do not seek HIV testing. Two-thirds of Africans in one study reported fear of dying as a major concern (Erwin, Morgan, Britten, Gray, & Peters, 2002). Stigma plays a major role in people delaying testing, notably because HIV/AIDS is still perceived, in light of the African experience of the disease, as a death sentence (F. M. Burns, Imrie, Nazroo, Johnson, & Fenton, 2007; Gazzard B on behalf of British HIV Association, 2006). The improved clinical experience for patients in the UK may not have been heard by migrant communities (Dodds, Mercey, Parry, & Johnson, 2004; Erwin, Morgan, Britten, Gray, & Peters, 2002). Cultural beliefs, social experience, and scepticism surrounding ART may fuel belief in alternative treatments or fatalistic acceptance (Erwin, Morgan, Britten, Gray, & Peters, 2002; Erwin & Peters, 1999). Fear of disclosure may influence some Africans to not get tested (F. M. Burns, Imrie, Nazroo, Johnson, & Fenton, 2007). Africans tend to tell fewer people about their HIV status. Erwin et al. found that 15% of Africans did not disclose their status even to close family or friends, compared to 3% of non-Africans (Erwin, Morgan, Britten, Gray, & Peters, 2002).

Characteristics other than migrant status are associated with an increased risk of presenting late with HIV. Many researchers have found that living in a region with a low prevalence of HIV increases the risk of late diagnosis. This pattern was found in the UK where the highest rates of late diagnosis are from outside London (Chadborn et al., 2005). Similar patterns have been reported from Spain (Castilla et al., 2002), Italy (Longo, Pezzotti, Boros, Urciuoli, & Rezza, 2005) and Australia (Hocking, Rodger, Rhodes, & Crofts, 2000). Possible explanations for these patterns are that either there is less perceived risk in areas with low prevalence, or greater stigma associated with it (Longo, Pezzotti, Boros, Urciuoli, & Rezza, 2005).

Most studies show that IDUs have lower rates of late diagnosis. This was shown in Sweden, (Brannstrom, Akerlund, Arneborn, Blaxhult, & Giesecke, 2005) the UK, (Manavi, McMillan, Ogilvie, & Scott, 2004) France, (Couturier et al., 1998) Spain, Italy (Castelnuovo et al., 2003; Girardi et al., 2004; Girardi et al., 2001; Girardi, Sampaolesi, Gentile, Nurra, & Ippolito, 2000; Longo, Pezzotti, Boros, Urciuoli, & Rezza, 2005), Poland (Rosinska, 2006) and Australia (Hocking, Rodger, Rhodes, & Crofts, 2000). Only in four studies in France were IDUs found to be more likely

to be late presenters (Baratin et al., 2004; Delpierre, Cuzin, Lauwers-Cances, Marchou, & Lang, 2006; Delpierre et al., 2007; Rotily, Bentz, Pradier, Obadia, & Cavailler, 2000).

Age is another factor that may influence risk of late diagnosis. Nearly all studies in all regions showed that older age, particularly over 40, is associated with increased risk of late diagnosis.

Most studies report that men are more likely to present late. This pattern was found in a large European study, (Giard, Gambotti, Besson, Fabry, & Vanhems, 2004) in the UK, (Gupta, Gilbert, Brady, Livingstone, & Evans, 2000; Saul, Erwin, Bruce, & Peters, 2000) France (Couturier et al., 1998; Delpierre, Cuzin, Lauwers-Cances, Marchou, & Lang, 2006; Delpierre et al., 2007), Spain (Castilla et al., 2002), Italy (Castelnuovo et al., 2003; Girardi et al., 2004; Girardi et al., 2001; Longo, Pezzotti, Boros, Urciuoli, & Rezza, 2005), the United States (Duffas, 2006; Mayben et al., 2007; Samet, Freedberg, Savetsky, Sullivan, & Stein, 2001) and Canada (Krentz, Auld, & Gill, 2004). Two studies from France (Baratin et al., 2004; Rotily, Bentz, Pradier, Obadia, & Cavailler, 2000), one pre-ART study in England (Poznansky et al., 1995) and a study in Sweden (Brannstrom, Akerlund, Arneborn, Blaxhult, & Giesecke, 2005) showed no difference between males and females. Only in one study in England, that used CD4 counts of less than 50/ μ l as the cut-off for late diagnosis, showed that females more often presented late (Sabin et al., 2004). This difference between males and females likely represents the fact that antenatal testing is routinely offered in Europe. In 2006, 84% of countries in the WHO European region offered routine testing to pregnant women, including most countries in Northern and Western Europe (Devaux I & Nardone A, 2007).

Most studies indicate that heterosexuals are at greater risk of late diagnosis than MSM. This was shown in Europe (Giard, Gambotti, Besson, Fabry, & Vanhems, 2004), in Sweden (Brannstrom, Akerlund, Arneborn, Blaxhult, & Giesecke, 2005), the UK (Boyd et al., 2005; Gupta, Gilbert, Brady, Livingstone, & Evans, 2000; Hamers & Downs, 2004; Manavi, McMillan, Ogilvie, & Scott, 2004), France (Baratin et al., 2004; Couturier et al., 1998; Delpierre, Cuzin, Lauwers-Cances, Marchou, & Lang, 2006; Delpierre et al., 2007), Italy (Castelnuovo et al., 2003; Girardi et al., 2001) Poland, (Rosinska, 2006), Canada (Krentz, Auld, & Gill, 2004) and Australia (McDonald, Li, Dore, Ree, & Kaldor, 2003). Only in Eastern Europe did it appear that MSM were more likely to present later than heterosexuals (Likatavicius G, Downs A, Alix J, Devaux i, & Nardone A, 2006).

Other characteristics associated with late diagnosis included having had a negative test in the past and having children (Delpierre, Cuzin, Lauwers-Cances, Marchou, & Lang, 2006; Delpierre et al., 2007; Girardi et al., 2004). Higher education was shown to be a risk factor in some studies (Couturier et al., 1998; Longo, Pezzotti, Boros, Urciuoli, & Rezza, 2005) but protective in another study (Centers for Disease Control and Prevention, 2003) and had no effect in another study (Krentz, Auld, & Gill, 2004). Having no or only one close friend is associated with increased risk for late testing (Samet, Freedberg, Savetsky, Sullivan, & Stein, 2001).

DISCUSSION

Late diagnosis of HIV has important individual, public health and economic consequences in Europe. A substantial proportion of people who die from AIDS are late presenters. Our review has shown that varying risk factors such as fear, stigma, lack of knowledge about health services or risk of infection can all influence an individual's choice to seek or not seek HIV diagnosis.

In order to explore the magnitude of late diagnosis in Europe and to promote appropriate prevention and testing policies, it is necessary to understand who is not coming forward for HIV testing. With nine different definitions of late diagnosis and wide differences existing across studies, countries and time, this means that data are not comparable. As a result it is difficult to assess the magnitude or temporal trends of the problem and to develop and monitor policies. Additionally, it appears that little is known of late diagnosis in many European countries, a knowledge gap that needs to be addressed. Standardizing the definition of late diagnosis will facilitate comparative analyses, support evaluations of policy initiatives, and offer insights into what works, where and why.

With global strategic advocacy of universal access to ART, people should be able to access effective treatment. But they can only benefit from advances in treatment if they are aware of their HIV status and are effectively accessing testing services. Although, in the mid 1990s, it was anticipated that the availability of ART would lead to earlier testing, this hope has not been realised in practice – broadly, rates of late diagnosis have either remained the same or increased. Confronted with substantial numbers of individuals unaware of their HIV status, there have been calls in a number of countries in Europe for an extension of provider-initiated routine opt-out testing (Hamill et al., 2007) (Delpierre, Cuzin, & Lert, 2007). On 30 May 2007, WHO and UNAIDS issued new guidance on HIV testing and counselling in health facilities (WHO/UNAIDS, 2007). These recommended

that HIV testing should normally be performed, much like other routine investigations, unless the patient declines in a number of medical settings such as STI, TB and antenatal clinics. The large numbers of individuals presenting late for diagnosis also has implications for testing policies (in addition to definitional issues) across Europe. By addressing more effectively and earlier the needs of individuals likely to present late, policy makers can offer benefits to both individuals and public health.

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Table 1. Definition of late diagnosis

Numerator	Region	Denominator	Author	Year
Less than one year	Europe	HIV	LikataVICIUS et al	2006
		HIV	Duffas et al	2006
	US	HIV	MMWR	2006
Less than six months	England	HIV	Sabin et al	2006
	France	AIDS	Couturier et al	1998
	Italy	AIDS	Longo et al	2005
Less than 3 months	Sweden	AIDS	Brannstrom et al	2005
	England	AIDS	Easterbrook et al	2000
	France	AIDS	Couzigou et al	2007
	France	AIDS	Baratin et al	2004
	Italy	AIDS	Girardi et al	2000
	Poland	AIDS	Rosinka	2006
	Canada	HIV	Krentz et al	2004
Less than eight weeks	Australia	AIDS	McDonald et al	2003
Less than 1 month	Denmark	HIV	Lohse et al	2005
	England	HIV	Burns et al	2001
	Spain	AIDS	Castilla et al	2002
	Italy	HIV	Castelnuovo et al	2003
	HIV concurrent with AIDS	Poland	HIV	Podlasin et al.
	England	HIV	Saul et al*	2006
	US	AIDS	Hogan et al	2001
	France	HIV	Rotily et al	2000
CD4 count less than 350	England	HIV	Saul et al*	2000
	US	HIV	Mayben et al	2007
CD4 count less than 200		HIV	Health Protection Agency	2006
		HIV	Brown et al	2006
		HIV	Sullivan et al	2005
		HIV	Chadborn et al**	2005
		HIV	Manavi et al***	2004
	UK	HIV	Gupta et al**	2000
		HIV	Delpierre et al	2007
	France	HIV	Delpierre et al	2006
	Italy	HIV	Girardi et al	2004
US	HIV	Samet et al	2001	
CD4 count less than 50	Spain	HIV	Santos	2005
	UK	HIV	Sabin et al	2004

* Test positive with CD4<350 or with AIDS defining illness

** England and Wales

***Scotland

Table 2 Incidence of late diagnosis

Country	Incidence	Special Population	Definition	Denominator	Sample Size	Author	Date	
UK	34%	Overall	CD4<200	HIV	7325	Health Protection Agency	2006	
	23%	MSM						
	28%	IDU						
	37%	Hetero Females						
	47%	Hetero Males						
	23%		HIV with AIDS	HIV	450	Saul et al***	2006	
	15%		CD4<50	HIV	719	Sabin et al	2004	
	33%		CD4<200	HIV	977	Sullivan et al	2005	
	38%	ANC	CD4<200	HIV	13	Manavi et al*	2004	
	34%	GUM		HIV	189			
	31%	MSM	CD4<200	HIV	14158	Chadborn et al**	2005	
	35%	Africans	< 1 month	HIV	143	Burns et al***	2001	
	13%	Non-Africans			243			
		23%		CD4<350 or AIDS diagnosis	HIV	450	Saul et al***	2000
		37%		CD4<200	HIV	1204	Gupta et al ⁺	2000
France	33%		CD4<200	HIV	1077	Delpierre et al	2007	
	38%		CD4<200	HIV	372	Delpierre et al	2006	
	27%		HIV with AIDS	HIV	825	Rotily et al	2000	
Italy	29%		CD4<200	HIV	968	Girardi et al	2004	
	33%		< 1 month	HIV	3483	Castelnuovo et al	2003	
Denmark ⁺	15%		<1 month	HIV	3941	Lohse et al.	2005	
Poland	36%		< 3 months	AIDS	803	Rosinka	2006	
Sweden	45%		< 3 months	AIDS	487	Brannstrom et al	2005	
France	42%		< 3 months	AIDS	1885	Couzigou et al	2007	
	30%		< 3 Months	AIDS	1901	Baratin et al	2004	
	19%		< 6 months	AIDS	359	Couturier et al	1998	
Spain	28%		<1 month	AIDS	30778	Castilla et al	2002	
Italy	37%		< 6 months	AIDS	16977	Longo et al	2005	
	25%		< 3 months	AIDS	968	Girardi et al	2000	

*Scotland **England and Wales ***England + Does not mention late diagnosis

Table 3 Incidence of late diagnosis in Europe (LSHTM survey results)*

Country	Prevalence rate	Year	Definition numerator	Definition denominator
Austria	26.7%	2005	Present with AIDS, 2nd aspect: CD4< 200	HIV
Bulgaria	20.0%	2005	CD4<200, and clinical presentation	HIV
Belarus	na		Present with clinical presentation WHO 3 or 4	HIV
Czech Republic	12-15 %	2005	Present with AIDS	HIV
Denmark	14.0%	2005	Present with AIDS	HIV
Estonia	na	2005	Present with AIDS	-
France	16.00% 28% if non-symptomatic Aids cases are counted	2005	Present with AIDS	HIV
Germany	30.0%	2005	CD4<200	HIV
Greece	14.1%	2005	Present with AIDS	HIV
Italy**	53.0%	2006	Present within 6 Months of AIDS diagnosis	AIDS**
Moldova	na		Present with AIDS or with CD4 < 200	HIV
Netherlands	31.0%	2005	CD4 < 200	HIV
Poland	8.9%	2002	Present with AIDS	HIV
Portugal	na		Present with AIDS	
Slovakia	na		Present with AIDS	-
Slovenia	na		Present with AIDS or CD4<200	-
Spain	38.0%		CD4<200	HIV
Switzerland**	50%; IDU (18%), Hetero (64%),	2005	Present within 3 Months of AIDS diagnosis	AIDS**
	27%;MSM (22%), Hetero (32%)	2005	Symptomatic (but not primary) infection (whether AIDS defining or not)	HIV
United Kingdom	34% MSM (22%), IDUs (28%), hetero women (37%) hetero men (47%)	2005	CD4 < 200	HIV

na= non available

4 Countries CD4 < 200
12 Countries present with AIDS
5 Countries present with AIDS or CD4 < 200
1 Country Present within 6 Months of AIDS diagnosis
1 Country Present within 3 Months of AIDS diagnosis

* 33 countries surveyed.

Responding countries: Austria, Bulgaria, Belarus, Czech Rep, Denmark, Estonia, France, Germany, Greece, Italy, Malta, Moldova, NL, Poland, Portugal, Russian Fed, Slovakia, Slovenia, Spain, Switzerland, UK. Malta and the Russian Fed did not report any information relative to late diagnosis.

Non respondents: Belgium, Cyprus, Finland, Ireland, Latvia, Lithuania, Luxemburg, Romania, Sweden

** in these studies, the % of late diagnosis is calculated as a proportion of AIDS cases

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