

Routine testing to reduce late HIV diagnosis in France

Cyrille Delpierre, Lise Cuzin, France Lert

INSERM U558 F-31073, Toulouse, France

Cyrille Delpierre
Epidemiologist, PhD

Unit of Infectious and Tropical Diseases, Hôpital Purpan, Toulouse, France

Lise Cuzin
MD

INSERM U687 F-94410, Saint-Maurice, France

France Lert
PhD

Correspondence to: C Delpierre, Department of Society, Human Development and Health
Harvard School of Public Health, Landmark Center, 401 Park Drive, Boston MA, USA
cdelpier@hsph.harvard.edu

Accepted: 4 April 2007

doi: [10.1136/bmj.39218.404201.94](https://doi.org/10.1136/bmj.39218.404201.94)

Although around half the French population has had an HIV test, many people are still not diagnosed until the disease is advanced. **Cyrille Delpierre, Lise Cuzin, and France Lert** believe the answer is to expand routine testing

Around 130 000 people in France were infected with HIV in 2005. Among the 7000 people newly diagnosed in 2004, 58% became infected through heterosexual intercourse, 29% through homosexual intercourse, and 2% through intravenous drug use. Around half of those infected through heterosexual intercourse came from sub-Saharan Africa.

In France, testing is free in all healthcare settings, and anonymous counselling and testing is provided in dedicated sites all over the country. Besides prenatal routine testing, current policy focuses on high risk groups (men who have sex with men, sub-Saharan migrants) and behaviours (unprotected sex). This policy results in a large number of tests annually. However, around 40% of cases identified are in people with advanced infection, most of whom belong to groups not focused on by the current testing policy. We discuss the consequences of late testing on mortality and spread of infection and recommend expanding HIV testing to all primary care settings.

Testing policy

Since the 1980s, France's institutional framework of HIV testing has been based on wide access to free voluntary counselling and testing, routine testing in blood and tissue donors, and routinely offering HIV tests to pregnant women and to people getting married or entering prison. Since 1997, national and regional information campaigns have been launched to increase the awareness of the potential benefits of early diagnosis. However, these efforts remained mainly focused on people with high risk behaviours. The result of this policy is a high rate of testing, with 82 tests per 1000 population in 2004, the highest rate in Europe after Austria,[1] and a positive test ratio of 2.4/1000 tests in 2004.[1]

Around half the French population has had at least one HIV test.[2] But, despite of this high level of testing, 40% of people already have AIDS or CD4 cells count below $200 \times 10^6/l$ when the HIV infection is first detected.[3] [4] Therefore, of the estimated 7000 people newly diagnosed with HIV in France in 2004,[1] 3000 may have advanced disease.

Consequences of late diagnosis

Late diagnosis is associated with an increased risk of mortality. Sabin and colleagues found that one fifth of HIV related deaths occurred in patients who had discovered their infection within the six months before their death.[5] Chadborn and colleagues also reported late diagnosis was a risk factor for short term mortality (odds ratio=10.76, 95% confidence interval 7.68 to 15.91).[6] In France, mortality in the six months after detection of HIV infection was 16 times higher for patients diagnosed with advanced disease than for patients diagnosed earlier.[7] The mortality two years after a first positive test result was 9% among those with advanced infection compared with 1% among those with earlier detection, and the difference in mortality remained four years after diagnosis. If we apply this rate to the estimated number of who had infection detected late in France in 2004, 270 people will die in the subsequent two years, representing 16% of the 1700 HIV related deaths in France each year.[8]

Late testing could also be important in the spread of the infection. In two trials to prevent transmission of HIV by increasing condom use,[9] [10] transmission was reduced by 20% among patients with identified HIV infection. Knowledge of infection status could increase the use of preventive measures and will also reduce the risk of transmission by reducing infectivity through treatment to lower the viral load. Quinn and colleagues reported a fall in infectivity of 2.45 for each tenfold decrease in viral load.[11]

Late diagnosis implies a long period without knowledge of infection and thus without access to care and counselling. Assuming that the normal CD4 cell count is $900 \times 10^6/l$ and that this rate decreases by $60-70 \times 10^6/l$ a year in infected people,[12] [13] it takes about 10 years before the CD4 cell count falls below $200 \times 10^6/l$. Infectivity could increase as the infection advanced. In a study of stable European couples, de Vincenzi and colleagues found that the cumulative incidence of seroconversion in the uninfected partner was 48.7% when the infected partner had advanced infection compared with 7.8% when the partner was in the non-advanced stage.[14]

Estimating the number of infections caused by late diagnosis is difficult and open to criticism because of the lack of data and because it relies on assumptions about, for example, characteristics of the infection and infected persons, the period of infectivity, and the number of partners. However, we can assume that the probability of transmission by people with a late diagnosis is similar to that observed during the natural course of infection. A US study estimated that during the natural course of infection, HIV infected men who have sex with men would transmit the virus to 1.16 sexual partners over their lifetime and infected heterosexual men and women would transmit the virus to 0.43 and 0.14 partners respectively.[15] Among people with a late diagnosis in our random sample of people diagnosed in France since 1996, 26.1% were men who have sex with men, 45.7% were heterosexual men, and 28.2% were women.[3] Applying the US transmission rate[14] and our sample composition to the 3000 people estimated to have been diagnosed late in France in 2004, men who have sex with men would have infected 908 people, heterosexual men 589 people, and women 118.

Late diagnosis may also increase the costs of hospital care and management of opportunistic infections, especially immediately after diagnosis. A study by Krentz and colleagues in Canada found that the direct costs of management were twice as high for patients who had CD4 cell counts $<200 \times 10^6/l$ at HIV diagnosis than for those with a higher CD4 count.[16] Similarly, in France the total mean monthly cost for the management of patients without AIDS was €670 (£450; \$900) per person when the CD4 cell count was $>500 \times 10^6/l$ compared with €1760 per person when the CD4 cell count was $<50 \times 10^6/l$. [17] During the month after the onset of AIDS, the cost increased from €1760 to €4530 depending on the opportunistic infections.

Strategies to reduce late diagnosis

HIV testing is more common in women and in people identified at higher risk of infection, such as men who have sex with men, young people, and those with multiple sexual partners.[1] [2] Conversely, those who are detected late tend to be older, mainly men, heterosexual, and have stable partners and children,[3] [4] populations that are not a priority target for testing. Thus the current policy results in people at low risk of HIV infection being at high risk of late detection.

With high quality HIV tests that limit false positive results, routine non-mandatory HIV testing of the general population could complement current testing policy. This view is supported by the higher proportion of early diagnosis among women and welfare beneficiaries. These populations receive more systematic HIV testing (welfare beneficiaries receive a free medical check up including an offer of an HIV test and women are offered testing during pregnancy or gynaecological follow-up).[3] Therefore, if testing became routine for other groups, HIV infections are likely to be identified earlier.

Two studies conducted in the US have estimated that it is cost effective to implement routine voluntary HIV testing in healthcare settings with a prevalence of unidentified HIV infection of 1% and even with prevalence as low as 0.1%.[15] [18] The prevalence of HIV infection in France is similar to that in the US (0.2% in France,[1] v 0.3% in United States). The number of unidentified HIV infections in France could be as high as 40,000,[19] a prevalence of 0.07%. All these models and assumptions do not consider the possible adverse impact of receiving a HIV negative test result—some people might continue having unprotected sex and may delay further testing leading to delayed diagnosis.[20]

Recommendations

Programmes of counselling and testing the heterosexual population should be sustained and developed for various medical settings. HIV tests should be offered as part of routine prevention activities by general practitioners and occupational health doctors. Doctors should integrate questions on sexual practices to help their patients consider HIV testing. Healthcare providers should encourage patients to inform their partners about their HIV status before giving up condoms and should recommend testing to people who have never been tested. They should also suggest repeat testing for those who have had new sexual partners since their most recent HIV test.

A US study calculated that if all people unaware of their HIV status could be screened, new sexually transmitted infections could be reduced by 31% a year.[21] Applying this rate to the 5200 new infections estimated per year in France,[1] of which 80% are due to sexual

transmission, 1290 new sexual infections could be avoided each year. The 2004 survey of the knowledge, attitudes, beliefs, and practices towards HIV showed an increase in the proportion of men and women who declared multiple sexual partners during the past year, the first rise since 1994.[2] The increase was biggest among heterosexual men under 30 years, women aged 25-39 years, those with a high level of education, and those in a high socioeconomic group. An increased proportion of these groups also said they were not concerned about the risk of HIV infection and had not had an HIV test in the past 12 months.

These results convey an increase in risk taking behaviours that is confirmed by rising numbers of sexually transmitted infections. Thus, the number of HIV infections could rise in the heterosexual population, and a substantial proportion of these future infections will be diagnosed late if testing policy does not change. France therefore needs urgently to improve testing policy to include the heterosexual population at low risk of infection but at high risk of late diagnosis.

Summary points

The rate of HIV testing in France is among the highest in Europe

Nevertheless 40% of newly identified HIV infections are in people with low CD4 counts or AIDS

Current testing policy fails to reach the heterosexual population

People at low risk of HIV infection are thus at high risk of late diagnosis

Routine voluntary HIV testing should be implemented in primary health care settings

Contributors and sources: CD has studied determinants of late testing in HIV infection. LC has published articles on the improvement of care management of HIV infected patients. FL has a long research interest on HIV testing policy and risk reduction. This article arose from previous works and Medline search. All the authors contributed to realise literature review and to write the paper.

Competing interests: None declared.

Provenance and peer review: Not commissioned, externally peer reviewed.

1. Institut de Veille Sanitaire. *Surveillance du VIH/SIDA en France au 30 juin 2005*. Paris InVS, 2006.
2. Beltzer N, Lagarde M, Wu-Zhou X, Vongmany N, Gremy I. *Les connaissances, attitudes, croyances et comportements face au VIH/SIDA en France*. Paris: Sante Ordl, 2005.

3. Delpierre C, Dray-spira R, Cuzin L, Marchou B, Massip P, Lang T *et al.* Correlates of late diagnosis in France. Implications for testing policy. *Int J STD AIDS* 2007;18:312-317.
4. Delpierre C, Cuzin L, Lauwers-Cances V, Marchou B, Lang T. High risk groups for late HIV diagnosis of HIV infection: a need for rethinking testing policy in the general population. *AIDS Patient Care STDS* 2006;20:238-47.
5. Sabin C, Smith C, Youle M, Lampe F, Bell D, Puradiredja D *et al.* Deaths in the era of HAART: contribution of late presentation, treatment exposure, resistance and abnormal laboratory markers. *AIDS* 2005;20:67-71.
6. Chadborn T, Baster K, Delpech V, Sabin C, Sinka K, Rice B *et al.* No time to wait: how many HIV-infected homosexual men are diagnosed late and consequently die? (England and Wales, 1993-2002). *AIDS* 2005;19:513-20.
7. Yeni R. *Prise en charge thérapeutique des personnes infectées par le VIH*. Paris, Médecine-Sciencec. Flammarion. 2006.
8. Lewden C, Jouglu E, Alioum A, Pavillon G, Lievre L, Morlat P *et al.* Number of deaths among HIV-infected adults in France in 2000, three-source capture-recapture estimation. *Epidemiol Infect* 2006:1-8.
9. NIMH Multisite HIV prevention Trial. Reducing HIV sexual risk behavior. *Science* 1998;280:1889-94.
10. Kamb ML, Fishbein M, Douglas JM Jr, Rhodes F, Rogers J, Bolan G *et al.* Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases: a randomized controlled trial. Project RESPECT Study Group. *JAMA* 1998;280:1161-7.
11. Quinn TC, Wawer MJ, Sewankambo N, Serwadda D, Li C, Wabwire-Mangen F *et al.* Viral load and heterosexual transmission of human immunodeficiency virus type 1. *N Engl J Med* 2000;342:921-929
12. Cook J, Dasbach E, Coplan P, Markson L, Yin D, Meibohm A *et al.* Modeling the long-term outcomes and costs of HIV antiretroviral therapy using HIV RNA levels: application to a clinical trial. *AIDS Res Hum Retroviruses* 1999;15:499-508.
13. Mellors JW, Munoz A, Giorgi JV, Margolick JB, Tassoni CJ, Gupta P *et al.* Plasma viral load and CD4+ lymphocytes as prognostic markers of HIV-1 infection. *Ann Intern Med* 1997;126:946-54.

14. De Vincenzi I. A longitudinal study of human immunodeficiency virus transmission by heterosexual partners. European Study Group on Heterosexual Transmission of HIV. *N Engl J Med* 1994;331:341-6.
15. Sanders GD, Bayoumi AM, Sundaram V, Bilir SP, Neukermans CP, Rydwak CE *et al.* Cost-effectiveness of screening for HIV in the era of highly active antiretroviral therapy. *N Engl J Med* 2005;352:570-85.
16. Krentz H, Auld M, Gill M. The high cost of medical care for patients who present late (CD4<200 cells/ μ L) with HIV infection. *HIV Med* 2004;5:93-8.
17. Yazdanpanah Y, Goldie S, Losina E, Weinstein MC, Lebrun J, Paltiel AD *et al.* Lifetime cost of HIV care in France during the era of highly active antiretroviral therapy. *Antivir Ther* 2002;7:257-66.
18. Paltiel AD, Weinstein MC, Kimmel AD, Seage GR, Losina E, Zhang H *et al.* Expanded screening for HIV in the United States—an analysis of cost-effectiveness. *N Engl J Med* 2005;352:586-95.
19. Sidaction. Le sida en France. www.sidaction.org/informer/sidafrance.
20. Centers for Disease Control and Prevention. Late versus early testing of HIV—16 sites, United States, 2000-2003. *MMWR: Morb Mortal Wkly Rep* 2003;52:581-6.
21. Marks G, Crepaz N, Janssen R. Estimating sexual transmission of HIV from persons aware and unaware that they are infected with the virus in the USA. *AIDS* 2006;20:1447-50.