

Characteristics and trends of newly diagnosed HIV-infections, 2000-2004

Jesús Castilla^a / José Manuel Lorenzo^b, Ana Izquierdo^c / María Eugenia Lezaun^d / Irene López^e / Conchi Moreno-Iribas^a / Domingo Nuñez^c / Milagros Perucha^d / Cleopatra R'kaina Liesfi^e / Daniel Zulaika^b

^aInstituto de Salud Pública de Navarra, Pamplona, España; ^bPlan de Sida del País Vasco, San Sebastián, España; ^cServicio de Epidemiología de Canarias, Santa Cruz de Tenerife, España; ^dServicio de Epidemiología de La Rioja, Logroño, España; ^eConsejería de Sanidad y Bienestar Social, Ciudad Autónoma de Ceuta, España.

(Características y tendencias de los nuevos diagnósticos de infección por el virus de la inmunodeficiencia humana [2000-2004])

Abstract

Objective: To describe the characteristics and trends of newly diagnosed HIV-infections.

Methods: We analysed all newly diagnosed HIV-infections among residents of the Canary Islands, Ceuta, La Rioja, Navarre and the Basque Country (Spain) between 2000 and 2004.

Results: In total, 1,807 HIV-infections –74.4 per million inhabitants, per year– were diagnosed. The heterosexual transmission category was the most frequent (48.6%), followed by that of homo/bisexual men (23.0%) and injecting drug users (IDU) (22.5%). From 2000 to 2004, the rate of new diagnoses of HIV infection decreased by 29.8% ($p < 0.0001$). The rate of diagnoses of infections acquired by IDU diminished by 58.5% ($p < 0.0001$), and the rate of infections associated with homo/bisexual practices in men descended by 33.9% ($p = 0.0318$). Nevertheless, the rate of diagnoses of infections by heterosexual transmission has not undergone significant changes. In the period 2002-2004, 28.7% of cases were diagnosed in foreigners, but the rate of diagnoses in the population of non-Spanish origin diminished by 24% ($p = 0.0534$). 39.7% of HIV diagnoses were delayed (with CD4 < 200 cells/microlitre or coinciding with the diagnosis of AIDS). This situation was less frequent in women (odds ratio = 0.5; $p < 0.001$) and increased with age amongst people over 30. The proportion of delayed diagnoses reached a maximum in 2001 (47.5%) and then declined until 2004 (38.6%; $p = 0.022$).

Conclusions: Although none of the analysed indicators evolved unfavourably, it is important to insist on the prevention of sexual transmission, the early diagnosis of HIV infection, and the need to adapt preventive activities and focus them on people from other countries.

Key words: HIV infection. Immigration. Epidemiology. Spain.

Resumen

Objetivo: Describir las características y tendencias de los nuevos diagnósticos de infección por el virus de la inmunodeficiencia humana (VIH).

Métodos: Se analizaron los nuevos diagnósticos del VIH entre los residentes en Canarias, Ceuta, La Rioja, Navarra y País Vasco desde 2000 hasta 2004.

Resultados: Se diagnosticaron 1.807 infecciones, 74,4 por millón de habitantes y año. Predominó la categoría de transmisión heterosexual (48,6%), seguida por la homosexual/bisexual (23,0%) y la de usuarios de drogas por vía parenteral (UDVP)(22,5%). Entre 2000 y 2004, la tasa de diagnósticos del VIH ha disminuido un 29,8% ($p < 0,001$). La tasa de diagnósticos de infecciones de la categoría de UDVP disminuyó un 58,5% ($p < 0,001$) y, en hombres, la de infecciones de la categoría homosexual/bisexual se redujo un 33,9% ($p = 0,0318$). La tasa de diagnósticos de infecciones de la categoría heterosexual no ha presentado cambios significativos.

En el periodo 2002-2004, el 28,7% de los casos correspondía a extranjeros, pero la tasa de diagnósticos en personas de otros países disminuyó un 24% ($p = 0,0534$). El 39,7% de los diagnósticos del VIH fueron tardíos (con CD4 < 200 células/ μ l o coincidiendo con el sida). Esta situación fue menos frecuente en mujeres (odds ratio = 0,5; $p < 0,001$) y aumentó con la edad a partir de 30 años. La proporción de diagnósticos tardíos alcanzó el máximo en 2001 (47,5%) y disminuyó hasta 2004 (38,6%; $p = 0,022$).

Conclusiones: Aunque ninguno de los indicadores analizados ha evolucionado desfavorablemente, se debe insistir en la prevención de la transmisión sexual, en el diagnóstico precoz de la infección por el VIH y en la adaptación de estas actividades a personas de otros países.

Palabras clave: VIH. Inmigración. Vigilancia epidemiológica. España.

Correspondence: Dr. Jesús Castilla.
Instituto de Salud Pública de Navarra.
Leyre, 15. 31003 Pamplona. Navarra. España.
E-mail: jcastilc@navarra.es

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Introduction

In the 1990s, Spain was the European country most affected by the AIDS epidemic, mainly because of the transmission of HIV amongst injecting drug users (IDU)^{1,2}. Once this situation became apparent, a series of vigorous measures were introduced to prevent the transmission of HIV amongst the population^{3,4}.

Reporting systems for newly diagnosed HIV infections provide invaluable information for identifying recent changes in transmission patterns, which is fundamental for organising preventative measures and evaluating their impact⁵⁻⁷. However, in Spain, only a few autonomous communities have information for several years that allows them to monitor the changes that have taken place in HIV epidemiology⁸⁻¹².

Several works have described the characteristics of people with the HIV infection who have begun treatment in health care centres¹²⁻¹⁵. Even so, population studies focusing on diagnoses of HIV infection remain necessary because they include people with clinical follow-ups at all types of centres, inmates of prison institutions and people who postpone starting medical follow-up after being diagnosed with the infection. Furthermore, with such a well-defined geographical area, it is possible to take into consideration demographic changes, including the influence of migration, and their impact upon the epidemiology of HIV.

We have analysed all newly diagnosed HIV-infections in five autonomous communities, placing special emphasis on time associated tendencies, on the country of origin of the patients and on quantifying cases of late diagnoses of HIV infection.

Methods

Sources of information

The present study jointly analyses data provided by the surveillance systems for newly diagnosed HIV infections registered in the Spanish autonomous communities of the Canary Islands, La Rioja, Navarre, the Basque Country, and the autonomous city of Ceuta. These systems have been developed within the respective public health competences of each autonomous community. Their origins can be traced back to the beginning of the HIV epidemic in the case of La Rioja and Navarre, to 1997 in the Basque Country, and to 2000 in the Canary Islands and Ceuta. The public health systems of these five communities have collected information referring to the whole of their respective territories, including prison establishments. New cases of HIV are detected by active searches carried out by public health professionals, who travel around at the end of every year to gather information on new diagnoses of

HIV from the data bases of the laboratories that carry out confirmatory tests and from the clinic services of public hospitals that treat HIV-infected patients. When required, these professionals also refer to the clinical records of patients in order to complete their clinical and epidemiological variables. The five communities systematically detect and exclude duplications and cases of patients who are not habitual residents within their respective territories and to do this they use information provided by the clinics and a system of patient identification codes that differ from community to community. Each case is assigned to the year of the first test in which the presence of antibodies against HIV was confirmed. The systems of Navarre and La Rioja have both been externally evaluated and demonstrated to have exhaustibility levels over 95%¹⁶.

Subjects and variables

In the present study we have analysed all the newly diagnosed HIV infections between 2000 and 2004 in people residing in these five communities. They did not include diagnoses of HIV infection in immigrants who were not officially registered or habitual residents of these communities, nor patients whose cases were diagnosed at temporary stay centres for immigrants. We only considered diagnoses that were confirmed by Western blot or other highly specific techniques.

The combined analysis was performed using anonymous data. The variables used were sex, age, HIV transmission category, country of origin, diagnosis of AIDS (when this was simultaneous with that of HIV) and the CD4 count at HIV diagnosis. Country of origin was only systematically available for the period 2002-2004. Patients with CD4+ lymphocyte count lower than 200 cells per microlitre and those who already presented signs of an AIDS defining disease were considered late diagnoses of HIV infection. This analysis did not include cases from La Rioja due to a lack of CD4 data for a high percentage of patients.

To calculate rates, we used population statistics based on the official residence register published by the *Instituto Nacional de Estadística* (National Institute of Statistics), according to which, the combined population of the five communities was 4,983,760 in January 2004, 6.3% of whom were of non-Spanish nationality. Rates of diagnoses of infections assigned to each HIV transmission category were calculated using the total population of each sex as the common denominator.

Statistical analysis

We used exact tests to compare the percentages and rates, and the Student's t test to compare averages. To

determine the factors associated with late diagnosis of HIV infection we included all of the variables in a multiple logistic regression model. Values of $p < 0.05$ were considered significant.

Results

Between the five communities, 1,807 new cases of HIV infection were diagnosed in the period 2000-2004, with an average annual rate of 74.4 cases per million inhabitants. The heterosexual transmission category was the most frequent (48.6%), followed by that of homo/bisexual men (23.0%) and that of IDU (22.5%). In the case of both men and women, the most frequent category for transmission was that of heterosexuals. The global rate for newly diagnosed HIV infections was three times greater among men than among women (112 and 37 per million, respectively; $p < 0.001$), the rate of diagnosis of infection in the IDU category was 3.7 times greater amongst men ($p < 0.001$) and in the heterosexual transmission category it was 56.5% greater amongst men than women ($p < 0.001$). The average age at which HIV was diagnosed was 37.0 years old (37.8 amongst men and 34.6 amongst women, $p < 0.001$), and ranged between 33.3 years old in the case of IDU women and 40.9 in heterosexual men (table 1).

Between 2000 and 2004 the rate of newly diagnosed HIV infections fell by 29.8% ($p < 0.001$). In men, this reduction was very clear, with a fall of 33.9% ($p < 0.001$), which was fundamentally due to a fall in IDU diagnoses (59.8%, $p < 0.001$) and, to a lesser extent, in the homo/bisexual category (29.1%, $p = 0.0318$); while the rate of infection diagnoses in the heterosexual transmission category did not experience any significant variation ($p = 0.939$). Amongst women, the overall rate of new HIV diagnoses did not change significantly during the study period ($p = 0.225$), although we did observe a significant reduction of 54.4% in this rate for diagnoses in the IDU category ($p = 0.018$) (table 2).

During the period 2002-2004 we had access to information relating to the country of origin of the patients and found that 28.7% of new diagnoses of HIV infection related to people who originally came from other countries. After Spanish natives, the next most frequent origins were Sub-Saharan Africa (11.7%), Latin America (9.6%) and Western Europe (4.8%). People from Sub-Saharan Africa displayed a much higher average annual rate of new diagnosis of HIV (2.7 per 1000 inhabitants) than people from other origins, although those from Latin America and from other European countries also presented rates that were higher than that of the Spanish population ($p < 0.001$). For people of all origins, the most frequent HIV transmission category was that of heterosexual transmission, which accounted for

Table 1. Newly diagnosed HIV-infections, by sex and transmission category. Data for the Canary Islands, Ceuta, La Rioja, Navarre and the Basque Country, for the period 2000-2004

	Cases	%	Mean annual rate per million inhabitants	Mean age (standard deviation)
Men				
Injecting drug users	320	23.8	26.6	34.8 (6.6)
Homo/bisexual	416	30.8	34.6	35.6 (9.9)
Heterosexual	532	39.4	44.2	40.9 (11.8)
Others	82	6.1	6.8	40.5 (13.0)
Total	1,351	100.0	112.2	37.8 (9.9)
Women				
Injecting drug users	87	19.0	7.1	33.3 (6.8)
Heterosexual	346	75.7	28.2	34.8 (10.5)
Others	23	5.3	1.9	36.2 (15.3)
Total	456	100.0	37.2	34.6 (10.2)
Both sexes				
Injecting drug users	407	22.5	16.8	34.5 (6.6)
Homo/bisexual	416	23.0	17.1	35.6 (9.9)
Heterosexual	878	48.6	36.1	38.5 (11.7)
Others	105	5.8	4.3	39.7 (13.6)
Total	1,807	100.0	74.4	37.0 (10.6)

94% of diagnosed cases of HIV in the case of Sub-Saharanans, 64% amongst North Africans, 58% amongst Latin Americans and 54% amongst people from Eastern Europe. The majority of diagnosed cases of HIV infection were amongst Spaniards (71.4%), a finding that was repeated for all of the transmission categories. In diagnoses by transmission category, it is important to highlight those of Latin American origin (14.6%) amongst homo/bisexual men, those of West European origin (9.6%) in the IDU category, Sub-Saharanans (21.9%) in the category of heterosexual men, and Sub-Saharanans (19.3%) and Latin Americans (16.5%) amongst heterosexual women (table 3). From 2002 to 2004 the population from countries other than Spain increased by 37%, while new diagnoses of HIV in this population only increased by 4%. As a result, the overall rate declined by 24% ($p = 0.053$). During this same period, the rate of diagnoses of HIV infection in the autochthonous population fell by 37% ($p < 0.001$).

In 24.9% of cases diagnosis of HIV coincided with that of AIDS. In 39.7% of cases, HIV diagnosis occurred with CD4+ lymphocyte count of lower than 200 per microlitre. Overall, 43.9% of HIV diagnoses were late, as defined by the fact that they were carried out either when there were lower than 200 CD4+ lymphocytes per litre or when the first diagnosis of AIDS disease had already taken place. After adjusting for other variables, this situation was less frequent in women (odds ratio = 0.5; confidence interval of 95%, 0.4-0.7; $p < 0.001$), and

Table 2. Newly diagnosed HIV-infections and rate per million inhabitants by transmission category, for each sex and year. Data for the Canary Islands, Ceuta, La Rioja, Navarre and the Basque Country

		2000	2001	2002	2003	2004	Change from 2000 to 2004	
							%	p ^b
Men								
Homo/bisexual	N. ^o	90	87	91	80	68		
	Rate ^a	38.8	36.7	37.6	32.6	27.5	-29.1	0.032
IDU	N. ^o	91	71	72	48	39		
	Rate ^a	39.2	30.0	29.8	19.5	15.8	-59.8	< 0.001
Heterosexual	N. ^o	83	120	124	118	87		
	Rate ^a	35.8	50.6	51.2	48.0	35.2	-1.7	0.939
Others	N. ^o	30	13	12	14	13		
	Rate ^a	12.9	5.5	5.0	5.7	5.3	-59.3	0.006
Total	N. ^o	294	291	299	260	207		
	Rate ^a	126.7	122.8	123.5	105.9	83.7	-33.9	< 0.001
Women								
IDU	N. ^o	27	21	16	10	13		
	Rate ^a	11.4	8.7	6.5	4.0	5.2	-54.4	0.018
Heterosexual	N. ^o	58	69	72	82	64		
	Rate ^a	24.4	28.6	29.3	32.9	25.5	+5.5	0.787
Others	N. ^o	8	3	3	6	4		
	Rate ^a	3.4	1.2	1.2	2.4	1.6	-52.6	0.256
Total	N. ^o	93	93	91	98	81		
	Rate ^a	39.1	38.5	37.0	39.3	32.3	-17.5	0.225
Both sexes	N. ^o	387	384	390	358	288		
	Rate ^a	82.4	80.2	79.9	72.4	57.8	-29.8	< 0.001

IDU: injecting drug user.

^aRate per million inhabitants for each sex.

^bp-value, obtained from comparisons between the rates for 2000 and 2004 using the 2-sided exact test.

in the 20 to 29 age group, and progressively increased with age. Furthermore, it was more frequent in cases of heterosexual transmission than in those involving IDU (odds ratio = 1.4; confidence interval of 95%, 1.0-1.9; $p = 0.041$). No differences were found with respect to country of origin. The proportion of late diagnoses reached a maximum in 2001 (47.5%) and then fell to 38.6% in 2004 ($p = 0.022$) (table 4).

Discussion

In the period 2000-2004, the five autonomous communities studied as a whole presented a predominantly heterosexual pattern of HIV transmission, with transmission between homo/bisexual men occupying second position and IDU transmission in third place. This confirmed a change in the epidemiological pattern of previous years, which was still, to a certain extent, reflected in the diagnosis of cases of AIDS in 2004, the majority of which were diagnosed in IDU¹⁷. This epidemiological change demonstrates new priorities in the prevention of HIV infection.

The results obtained show very important advances in the prevention of infections in IDU. Cases of infection associated with this cause continued to be diagnosed, but the rate declined considerably. This trend has been explained by fewer young people starting to consume injected drugs¹⁸ and by measures to extend methadone and needle exchange programmes¹⁹. Unlike the case of IDU, in homo/bisexual men and in the heterosexual population there has been a generational change that, if anything, makes it even more necessary to periodically renew health risk warnings and campaigns in order to prevent new upsurges in transmission^{20,21}. Heterosexual transmission of HIV has remained at a stable endemic level. Preventive measures have continued, but new circumstances have arisen, such as an increase in sexually transmitted infections²² and the arrival of immigrants from countries with high levels of endemicity²³, which have made it difficult to continue making such progress. The increase in sexually transmitted infections could have had repercussions for the incidence of HIV, because it favours its transmission and is a good indicator of the frequency of sexual risk behaviour.

The majority of HIV diagnoses related to the autochthonous population. Even so, the rate of HIV diag-

Table 3. Newly diagnosed HIV infections by transmission category and country of origin. Data for the Canary Islands, Ceuta, La Rioja, Navarre and the Basque Country for the period 2002-2004

Country of origin	Homo/ bisexual men		IDU		Heterosexual men		Heterosexual women		Others		Total		Rate ^a
	n	%	n	%	n	%	n	%	n	%	n	%	
Spain	187	78.2	167	84.3	217	66.0	126	57.5	42	82.4	739	71.3	53
Western Europe	15	6.3	19	9.6	10	3.0	6	2.7	0	0	50	4.8	172
Eastern Europe	0	0	4	2.0	2	0.6	5	2.3	2	3.9	13	1.3	192
Latin America	35	14.6	2	1.0	21	6.4	37	16.9	4	7.8	99	9.6	258
Sub-Saharan Africa	1	0.4	4	2.0	72	21.9	42	19.2	2	3.9	121	11.7	2,685
North Africa	1	0.4	2	1.0	6	1.8	1	0.5	1	2.0	11	1.1	104
Others	0	0	0	0	1	0.3	2	0.9	0	0	3	0.3	54
Total	239	100	198	100	329	100	219	100	51	100	1,036	100	69

IDU: injecting drug user.

^aAverage annual rate per million inhabitants of each origin.

noses among Sub-Saharanans was 50 times greater, with the majority of these infections being attributable to heterosexual transmission. The great prevalence of HIV infection and of risk behaviour in their countries of origin could persist amongst these collectives after their arrival in Spain. Latin Americans also presented high rates of HIV infection, mainly due to homosexual transmission in men and heterosexual transmission in women. Amongst possible explanations for this could be the selective migration of people already affected in search of treatment and the social situations found on them reaching Spain, which may force them into situations of greater risk, such as those associated with involvement in the world of female or male prostitution²⁴⁻²⁶. Finally, people of European origin, including those from the European Union, also presented higher rates of HIV diagnosis than the autochthonous population. Some countries that are frequent sources of immigration, such as Portugal^{1,23}, have reported high rates of new diagnoses of HIV infection. Furthermore, mobility itself, combined with a change of culture and language, constitutes an added difficulty with respect to systematically maintaining safe behaviour²⁷. Despite what has just been said, the results obtained refute the allegation that the arrival of immigrants could have caused a new surge in the epidemic, because the rate of HIV diagnosis amongst the population proceeding from other countries has fallen. Even so, amongst this population, the needs with respect to preventive measures are greater and progress remains slower than with the autochthonous population.

Around 40% of diagnosed cases of HIV related to advanced states of infection, although this percentage has again fallen in recent years. The fact that many of those affected and the health care staff who attend to them often do not suspect HIV infection means that opportunities are lost to prevent transmission and treat those affected²⁸. The frequency of late diagnosis of HIV

infection was lower amongst women²⁹⁻³¹, which has been attributed to the fact that they are more frequent users of health care services, HIV tests are recommended to all pregnant women and to the greater medical control of those whose partners are known to have the HIV infection²⁹. Late HIV diagnoses were less frequent amongst the 20 to 29 age group and progressively increased amongst older age groups, reflecting their lower perception of risk and submission to the test. In any case, the fall in the frequency of late diagnosis is a favourable development and indicates a reduction in cases of undiagnosed HIV infection.

The combined rate for the five communities can be compared with those of other countries in Western Europe, because the case criteria and definitions applied were similar. In 2000 this combined rate was below those of Portugal, Switzerland, Belgium and Luxemburg; and in 2003, as well as the four previously mentioned countries, the rate also fell below those of the United Kingdom and Ireland¹. During the 1990s, these five autonomous communities had exhibited rates of AIDS incidence that were much higher than those of any other country in Europe, and in 2003 they still had higher rates than the rest of the countries in Western Europe except Portugal. Thus, the rates and trends for new diagnosis of HIV that we have found point to a much more favourable evolution in the epidemic over the last few years than in other neighbouring countries.

When interpreting these results, it is important to take into consideration certain rather specific circumstances. Although several autonomous communities have been included in the study, and no great differences have been observed between them, these results may not necessarily be representative of other Spanish autonomous communities, which may follow different epidemiological patterns. We cannot rule out a certain percentage of misclassification of cases in some transmission categories due to the fact that some people may deny engaging in

Table 4. Frequency of late diagnosis of HIV (coinciding with diagnosis of AIDS or with CD4+ count lower than 200 cells/ μ l) and analysis of associated factors. Data for the Canary Islands, Ceuta, Navarre and the Basque Country for the period 2000-2004

	Diagnoses of HIV		Multivariate analysis*		
	No.	%	Odds ratio	95%CI	p
Sex					
Men	1,071	47.2	1		
Women	336	33.0	0.5	0.4-0.7	<0.001
Age (years)					
0-19	19	36.8	1.8	0.7-5.0	0.254
20-29	307	26.1	1		
30-39	605	40.5	1.9	1.4-2.5	<0.001
40-49	301	55.8	3.2	2.3-4.6	<0.001
\geq 50	175	66.3	4.5	3.0-7.1	<0.001
Transmission category					
IDU	299	39.1	1		
Homo/bisexual	353	40.8	0.9	0.7-1.3	0.674
Heterosexual	669	47.2	1.4	1.0-1.9	0.041
Others	86	44.3	1.0	0.6-1.7	0.970
Country of origin					
Spain	1,050	45.0	1		
Western Europe	68	47.1	1.3	0.8-2.2	0.280
Latin America	125	41.6	1.2	0.8-1.9	0.328
Africa	152	37.5	0.9	0.6-1.3	0.424
Others	12	25.0	0.9	0.2-3.6	0.888
Year of diagnosis					
2000	302	40.4	1.3	0.9-1.9	0.197
2001	303	47.5	1.5	1.1-2.2	0.022
2002	308	47.1	1.4	1.0-2.1	0.050
2003	258	44.2	1.2	0.8-1.8	0.310
2004	236	38.6	1		
Total	1,407	43.8			

CI: confidence interval; HIV: Human Immunodeficiency Virus; IDU: injecting drug user.

*Results of a logistic regression model that includes all the variables presented in the table and the autonomous community of residence.

types of behaviour that generate a certain degree of social repulsion. These analyses do not include diagnoses of HIV carried out at temporary stay centres for immigrants, although in some cases, as in that of Ceuta, these account for more than half of new diagnoses of HIV infection. In these cases, infections were acquired outside Spain and therefore suppose a new reality with respect to the epidemiology of HIV, which –given its rather special circumstances– really calls for independent analysis. The collection of data was completed at the end of each year through conducting active searches that effectively ruled out any delay in notification. Even so, the residents of these autonomous communities who were diagnosed with HIV and had their cases followed outside their community of origin may well have been excluded from this analysis, which would have produced an underestimation of rates, especially for the last few years. Even so, this effect would have been of very small magnitude because almost all of the cases in which the national AIDS register informed

these autonomous communities of cases that have been notified in other communities corresponded to cases of previously registered HIV infection. Finally, we think that the omission of private centres will have had little effect upon the results. Due to the high cost and public financing of treatments, almost all cases of HIV infection are treated at hospitals that form part of the public health network.

In summary, this study provides evidence of a decrease in the transmission of HIV in the autonomous communities studied which –to a certain extent– may be interpreted as reflecting the successful application of preventive measures introduced in the past. Although none of the indicators analysed presented an unfavourable evolution, the situation described suggests that it is particularly important to: insist on measures for preventing sexual transmission, develop prevention programmes focusing on people of foreign origin and, encourage early diagnosis of HIV infection.

References

- European Centre for the Epidemiological Monitoring of AIDS. HIV/AIDS Surveillance in Europe. End-year report 2003. Saint-Maurice: Institut de Veille Sanitaire; 2003. N.º 70.
- Secretaría del Plan Nacional sobre el Sida. VIH y sida en España, Situación epidemiológica, 2001. Madrid: Ministerio de Sanidad y Consumo; 2002.
- Secretaría del Plan Nacional sobre Sida. Plan de movilización multisectorial contra el VIH/sida, 1997-2000. Madrid: Ministerio de Sanidad y Consumo; 1998.
- Secretaría del Plan Nacional sobre Sida. Infección por VIH y sida. Plan Multisectorial 2001-2005. Madrid: Ministerio de Sanidad y Consumo; 2001.
- Gostin OL, Ward JW, Baker AC. National VIH case reporting for the United States. *N Engl J Med.* 1997;337:1162-6.
- Centers for Disease Control and Prevention. Guidelines for national human immunodeficiency virus case surveillance, including monitoring for human immunodeficiency virus infection and acquired immunodeficiency syndrome. *MMWR.* 1999; 48(RR13):1-28.
- Infuso A, Hamers FF, Downs AM, Alix J. HIV reporting in western Europe: national systems and first European data. *Euro Surveill.* 2000;5:13-7.
- Moreno C, Huerta I, Lezaun ME, González A, Sola J, Castilla J. Evolución del número de nuevos diagnósticos de infección por el VIH en Asturias, Navarra y La Rioja. *Med Clin (Barc).* 2000;114:653-5.
- Moreno-Iribas C, Irisarri F, Elizalde L, Urtiaga M, Sola J, Fernández-Jáuregui C, et al. Progresos en el control de la infección por el VIH y el sida en Navarra, 1985-2003. *An Sist Sanit Navar.* 2004;27:221-31.
- Zulaika D, Aguirrebengoa K, Andía A, Arrizabalaga J, Bustillo JM, Cámara MM, et al. Características epidemiológicas de las nuevas infecciones causadas por el VIH comparadas con los casos de sida. La epidemia de VIH/sida en el País Vasco. *Gac Sanit.* 2004;18:145-9.
- Centre d'estudis epidemiològics sobre el VIH/sida de Catalunya (CEESCAT). Sistema Integrat de Vigilància Epidemiològica del VIH/sida a Catalunya (SIVES); 2004. Document tècnic n.º 17.
- González-Celador R, Sacristán-Salgado A, Valero LF, Sáenz-González MC. Epidemiología de la infección por el virus de la inmunodeficiencia humana (VIH) en la provincia de Salamanca (1985-2002). *Enf Infecc Microbiol Clin.* 2004; 22:272-8.
- Jaén A, Casabona J, Esteve A, Miró JM, Tural C, Ferrer E, et al. Características clinicoepidemiológicas y tendencias en el tratamiento antirretroviral de una cohorte de pacientes con infección por el virus de la inmunodeficiencia humana. Cohorte PISCIS. *Med Clin (Barc).* 2005;124:525-31.
- Teira R, Suárez-Lozano I, Muñoz P, Viciano P, Lozano F, Galindo MJ, et al. Patrón epidemiológico de la infección por el VIH en 15 hospitales españoles: casos de nuevos diagnósticos incluidos en la cohorte VACH en 2001 y 2002. *Enferm Infecc Microbiol Clin.* 2005;23:213-7.
- Castilla V, Alberdi JC, Barros C, Gómez J, Gaspar G, Sanz J. Cohorte multicéntrica de pacientes con infección VIH de la corona metropolitana sudeste de Madrid (COMESSEM): fundamentos, organización y resultados iniciales. *Rev Clin Esp.* 2003;203:170-7.
- Caro Murillo AM, Moreno Iribas C, Irisarri F, Castilla Catalán J, Napal V, Varela Santos C, et al. Evaluación del registro de infección por VIH en Navarra, 1985-2003. *Gac Sanit.* 2005;19 Suppl 1:44.
- Registro Nacional de Sida. Situación epidemiológica a 30 de junio de 2005. Madrid: Centro Nacional de Epidemiología, 2005 [accessed 26/08/2005]. Available in: http://cne.isciii.es/ht-docs/sida/informe_sida.pdf
- De la Fuente L, Barrio G, Royuela L, Bravo MJ. The transition from injecting to smoking heroin in three Spanish cities. *Addiction.* 1997;92:1733-44.
- Observatorio Español sobre Drogas. Informe n.º 5, Julio 2002. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas; 2002.
- Del Romero J, Castilla J, García S, Clavo P, Ballesteros J, Rodríguez C. Time trend in HIV seroconversion incidence among homosexual men repeatedly tested in Madrid, 1988-2000. *AIDS.* 2001;15:1319-21.
- Grupo del Estudio EPI-VIH. Prevalencia de VIH en varones homo/bisexuales, 1992-2000. *Med Clin (Barc).* 2002;119: 413-5.
- Díaz Franco A, Noguez Zambrano I, Cano Portero R. Situación epidemiológica de las infecciones de transmisión sexual en España (1995-2003). *Bol Epidemiol Semanal.* 2004; 12:221-4.
- Secretaría del Plan Nacional sobre Sida. Prevención del VIH/sida en inmigrantes y minorías étnicas. Madrid: Ministerio de Sanidad y Consumo; 2001.
- The EPI-VIH Study Group. HIV infection among people of foreign origin voluntarily tested in Spain. A comparison with national subjects. *Sex Transm Infect.* 2002;78:250-4.
- Belza MJ for the EPI-VIH Group. Risk of HIV infection among male sex workers. *Sex Transm Infect.* 2005;81:85-8.
- Belza MJ, Clavo P, Ballesteros J, Menéndez B, Castilla J, Sanz S, et al. Condiciones sociolaborales, conductas de riesgo y prevalencias de infecciones de transmisión sexual en mujeres inmigrantes que ejercen la prostitución en Madrid. *Gac Sanit.* 2004;18:177-83.
- Del Amo J, Bröring G, Hamers FF, Infuso A, Fenton K. Monitoring HIV/AIDS in Europe's migrants communities and ethnic minorities. *AIDS.* 2004;18:1867-73.
- Janssen RS, Holtgrave DR, Valdiserri RO, Shepherd M, Gayle HD, De Cock KM. The serostatus approach to fighting the HIV epidemic: prevention strategies for infected individuals. *Am J Public Health.* 2001;91:1019-24.
- Castilla J, Sobrino P, De la Fuente L, Noguez I, Guerra L, Parras F. Late diagnosis of HIV infection in the era of highly active antiretroviral therapy: consequences on AIDS incidence. *AIDS.* 2002;16:1945-51.
- Girardi E, Sampaolesi A, Gentile M, Nurra G, Ippolito G. Increasing proportion of late diagnosis of HIV infection among patients with AIDS in Italy following introduction of combination antiretroviral therapy. *J Acquir Immune Defic Syndr.* 2000; 25:71-6.
- Porter K, Wall PG, Evans BG. Factors associated with lack of awareness of HIV infection before diagnosis of AIDS. *BMJ.* 1993;307:20-3.