2. Monitoring the prevalence of HIV and STIs

2.1. Estimate of the overall prevalence of HIV infection in Catalonia

The difficulty in doing a transversal study on the whole population of Catalonia of an infection which is relatively infrequent obliges us to obtain data on prevalence using estimates and studies performed on selected groups. CEEISCAT carries out epidemiological transverse studies with the aim of finding out the prevalence of HIV infection in different groups. This measure allows us to estimate the total number of people infected with HIV at any given time.

Although it is only an approximation of an important piece of information in the planning of preventative interventions for HIV infection, the estimate of prevalence is justified because the system of declaration of new HIV diagnoses is not exhaustive (see **2.2.1**). Given this fact, the estimate of prevalence cannot be obtained by subtracting the number of deaths from AIDS from the number of those diagnosed with HIV (prevalence = the number of diagnosed – AIDS deaths), and so it has been calculated starting from the summation of sector estimates (prevalence = risk population x estimated prevalence in each sector of the population) [1].

To make an estimate of the overall prevalence of HIV, just as in previous reports, data from the studies shown in **table 2.1.1** was used as sector estimators of HIV prevalence (p): unrelated anonymous screening of newborn babies and working population, the systematic screening of donated blood and the transversal studies in IDUs, FSW and MSM. In the case of the IDUs, unlike previous years (see Integrated AIDS/HIV/STI Surveillance System of Catalonia (SIVES, according to the Catalan acronym) 2008), data of prevalence has been used from IDU recruited in harm reduction centres.

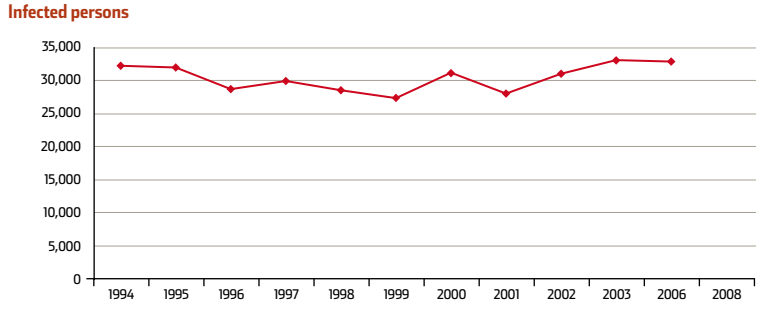
Estimates corrected and revised in accordance with the 1991 census of the National Institute of Statistics were used as denominators (n), on 1st July every year from 2001 [2] and the projections of population calculated initially in the 2001 census of the same institute and then for the following years [3]. To calculate the approximate number of MSM, the transversal national study of homosexuality in the United Kingdom was extrapolated [4], and to calculate the IDU group, both data from the capture-recapture studies carried out in Barcelona [5], and of the European Monitoring Centre of Drugs and Drug Addiction were used [6]. People aged over 65 years were excluded from the denominators in the estimations.

Data from the NENEXP study on the prevalence of HIV in children aged below one year was used for the estimate of the number of infections in this age group (see section 5 for more information) [7-8], whilst for children aged from 1 to 14 years data provided by the Spanish Paediatric Collaborative Group was used.

From 1994 until 2008 the overall prevalence of HIV was estimated in Catalonia using the same methodology, applying the prevalence observed and the demographic estimates adapted to each year. The method of approximation of normal distribution was used for the calculation of confidence intervals of 95% (CI 95%), in the cases in which the population measurements (n) and the observed prevalence (p) fulfilled the conditions $np \geq 5$ i $n(1-p) \geq 5$: the exact method was applied in the populations which did not verify previous conditions [9].

The number of people living with HIV in Catalonia in 2008 was estimated at 34,957 (CI 95%: 25,702 – 39,474) in the general population (**figure 2.1.1**); which is to say, 6 people out of every 1,000 aged between 15 and 64 years could be infected with HIV. This does not suppose a

Figure 2.1.1. HIV infected people amounts evolution. Catalonia, 1994-2008.



significant decrease with regard to the estimates for 2003, which put the number at about 33,000 people (7 per 1,000). It is also important to emphasise that, in accordance with our estimates, there could be around 4,000 women of childbearing age infected with HIV. Figure 2.1.1 shows the tendency for the global prevalence of HIV estimated in Catalonia for the period 1994-2008.

2.2. Prevalence of HIV in sentinel groups

As well as serving as the basis for the estimation of the number of people living with HIV infection in Catalonia, the monitoring of sentinel groups allows us to know the variations or trends of prevalence in these groups and the distribution of the infection, complementing the information received from the declaration of new HIV diagnoses. Representativeness, homogeneity and accessibility were the criteria used to select these groups which aim to reflect both the general population and the groups within it with the highest risk activities associated with acquiring HIV.

According to the methodology used for the collection of information, the following categories are included in the groups under research:

a) The prevalence of HIV infection detected through non-related anonymous screenings
This category included studies which use samples of dried blood, collected for objectives other than obtaining prevalence, in the following cases:

- A representative sample of living new born babies in Catalonia from the Neonatal Metabolic Screening Program taken each year.
- Routine annual medical check-ups of industry and service workers in Catalonia.

b) The prevalence of HIV infection through voluntary and anonymous transverse studies
This category comprised of transverse field studies carried out anonymously and voluntarily to monitor the prevalence of HIV infection in various groups at risk of exposure to the virus, testing for the virus in saliva samples. The groups studied were:

- IDUs recruited on the street.
- IDUs recruited in harm reduction centres.
- MSM recruited in gay bars, sex venues, and cruising areas.
- FSW recruited on the street, in apartments and sex joints.

c) HIV prevalence through systematic information collection
This category includes the information systems which systematically collect data on HIV in specific groups. Taking a HIV antibody tests is voluntary (excepting for blood donors) and confidential. Those groups studied included:

- All blood donations carried out in Catalonia.
- IDUs on initiating treatment for drug dependency in the Network of Drug Dependence Help Centres.
- Inmates of 3 penitentiary centres

Table 2.1.1 shows the overall results of the prevalence of infection according to the different studies mentioned in the general population and in especially vulnerable groups, whilst figure 2.2.1 shows the trends of HIV infection prevalence in sentinel groups (new born babies, induced abortions (IA), blood donations, and the working population). The HIV infection prevalence studies via non-related anonymous screenings or voluntary transverse studies used the algorithms recommended by the WHO/UNAIDS for detection of antibodies in this type of study [10].

Figure 2.2.1 shows a slight increase in prevalence rates in blood donations in 2005, after they had stabilised between 5 and 7 HIV infections per 100,000 donations in previous years. There was a certain trend towards increasing seroprevalence in the last two years of the study of the working population, whilst prevalence halted its decline in the sentinel group of new born babies in the last two years (2007 and 2008).

On the other hand, in the case of IA, in spite of selection and participation bias resulting from the voluntary nature of the inclusion of women in this study, seroprevalence has stabilised after the decrease witnessed in 2003.

Regarding data from non-related anonymous screening of new born babies in Catalonia, in 2008 there was an overall seroprevalence of 0.15%, and Terres de l'Ebre was the region with the highest prevalence (0.46%) according to the latest available in-

Table 2.1.1. Summary of epidemiological surveillance of HIV infection in sentinel populations in Catalonia, 2007-2008.

Population	Start year	Regularity	Biological sample	Latest data available	Population volume	Prevalence (%)
General population						
Newborns (pregnant women)	1994	Yearly	Dry blood	2008	40,514	0.15
Women that voluntarily interrupt their pregnancy	1999	Yearly	Dry blood	2006	3,891	0.10
Workers during medical checkup	1999	Yearly	Serum	2008	3,035	0.20
Blood donors	1987	Yearly	Serum	2005	260,608	0.01
High risk populations						
IDU recruited on the street	1993	Every two years	Saliva	2006	296	58.10
IDU recruited on the harm reduction centres	2008	Every two years	Saliva	2008-9	745	34.50
IDU that start treatment	1996	Yearly	Serum	2008	446	41.00
MSM*	1995	Every two years	Saliva	2008	142	20.40
FSW	2005	Every two years	Saliva	2007	400	2.5
Penitentiary population	1995	Yearly	Serum	2008	4,241	14.70
Tuberculosis patients	1998	Yearly	Dry blood	2006	60	23.33

* SIALON Project, which used the same recruitment centres as previous years).

Figure 2.2.1. Changes in the prevalence of HIV infection in Catalonia in different Sentinel populations (1990-2008).

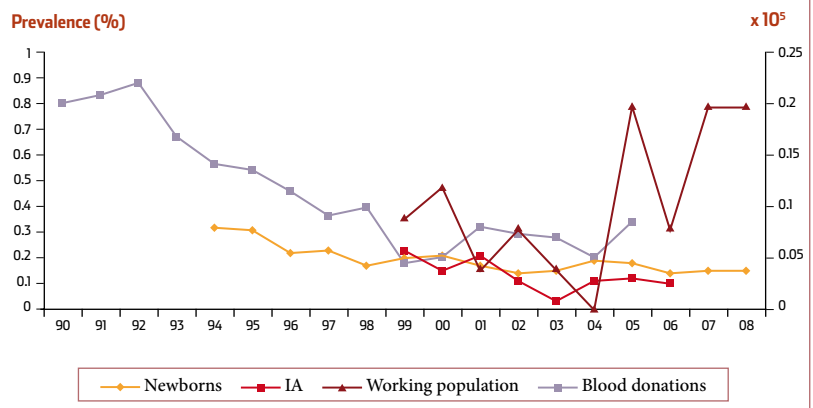


Table 2.2.1. Prevalence of HIV infection in pregnant women (HIVNADO) in Catalonia, 2008.

	2008				
	Analyzed newborns	HIV	Preval. %	CI 95 %	
Barcelona	26,845	36	0.13	0.09	0.17
Catalunya Central	2,819	6	0.21	0.04	0.38
Girona	4,117	11	0.26	0.10	0.42
Lleida	1,944	3	0.15	-0.02	0.32
Alt Pirineu i Aran	364	1	0.27	0.26	0.80
Tarragona	3,511	3	0.08	-0.01	0.17
Terres de l'Ebre	6,862	4	0.46	0.30	0.62
Total	**40,462**	**64**	**0.15**	**0.11**	**0.19**

formation (**table 2.2.1**). Nonetheless, it should be noted that with the creation of the new health regions, there was a great variability in the measuring of samples obtained between the regions. Barcelona represents 67% of the samples analysed, whilst regions such as Alt Pirineu i Aran only represent 1% and 2% of all the regions. Therefore, the geographical differences are not statistically significant. Overall, 2 out of every 1,000 pregnant women in Catalonia are infected with HIV.

The evolution of seroprevalence according to age group of the mothers showed a decreasing trend until 2006 in the age groups 20-24 years and 30-34 years but in the most recent years (2007 and 2008), seroprevalence rose slightly again. In the newly born babies of mothers younger than 20 years old, the trends are erratic and rather variable over the time period 1994 to 2008. In mothers aged over 34 years seroprevalence has been progressively increasing over the

Figure 2.2.2. Seroprevalence evolution per mother age groups, 1994-2004. (HIVNADO study).

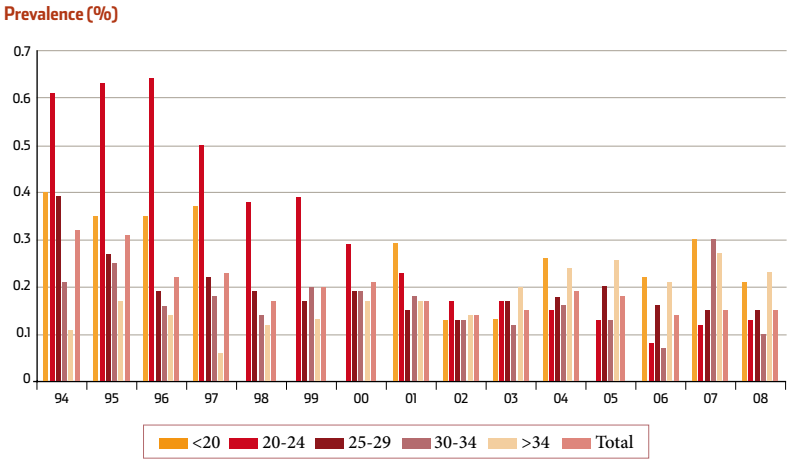
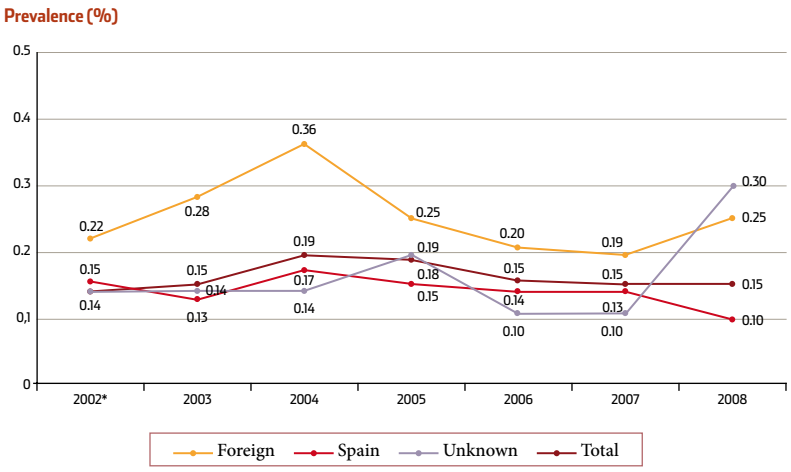


Figure 2.2.3. Seroprevalence evolution per mothers' country of origin, 2002-2008. (HIVNADO study).



* Origin was only compiled since June this year.
** Country of origin information corresponding to 2006 is not available.

years and there has been a stabilising of seroprevalence in the middle group, aged between 25 and 29 years.

This data could be as much a reflection of a real increase in prevalence of HIV infection in specific population groups, as an increase in the desire to have children in older HIV-positive women. Since the introduction of HAART which has proven to be effective not only in the improvement of health and prognosis of the infection but in the prevention of VT of HIV, the situation and expectations of infected women of child bearing age have changed completely (**figure 2.2.2**).

Since June 2002 the women participating in the study provide information on their country of origin. In this period statistically significant differences ($p < 0.5$) have been seen in the seroprevalence of HIV antibodies in women born in Spain and in women born in other countries. **Figure 2.2.3** shows the differences and trends of seroprevalence in women according to country of origin based on the years available.

In 2008 the prevalence of HIV infection in samples of saliva collected in IDUs recruited in harm reduction centres was 34.5%. This prevalence is lower than that observed in previous evaluations of IDUs recruited on the street and lower than the prevalence seen in injectors recruited in the Network of Drug Dependence Help Centres, which was 41% in 2008 (**figure 2.2.4**). The differences in the recruitment methodology employed in each study may partially explain the differences observed in the prevalence of HIV. Of the 3 IDU sentinel groups, the one obtained from harm reduction centres is the most representative as it includes injectors who may or may not be in treatment for drug dependency, as well as a sample of IDUs from other countries (41.3% of the interviewees), and thus better reflects the reality of current injection drug-taking in Catalonia.

On the other hand, the transverse studies in MSM recruited on the street showed a significantly rising overall trend (from 14.2% in 1993 to 20.4% in 2008) (**figure 2.2.4**), concur-

rent with the increase in sexual risk behaviour seen in this group [11].

Finally, there was a low prevalence of HIV (2.5%) in FSW recruited in Catalonia, just as had been observed in the evaluation in 2005. If the country of origin is taken into account, prevalence is significantly greater amongst Spanish women (8.9% in Spanish women and 1.5% in immigrant women). This result is consistent with other studies where this group of FSW is associated with a higher frequency of injecting drug use [12].

2.3. Transverse Study of the Prevalence of STIs

Since 2005 CEEISCAT has incorporated the monitoring of STIs in transverse studies of prevalence in groups at risk [13-16]. In these biennial studies, the Department of Microbiology in the HUGTiP collects data on the behaviour and clinical-epidemiological characteristics of the group under study and tests are carried out in order to detect *Chlamydia trachomatis* and/or *gonorrhoea* using DNA amplification techniques (Real Time Polymerase Chain Reaction (PCR))

2.3.1. Young Offenders in penitentiary centres (CT/NG-Prisons)

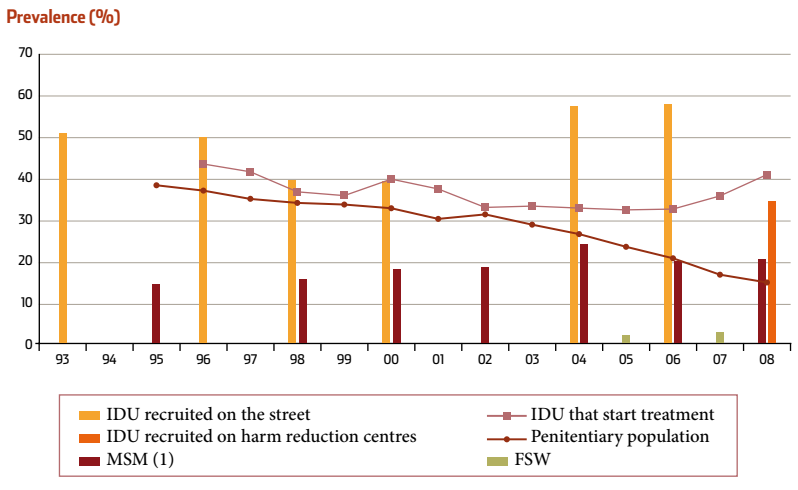
A study was initiated during the course of 2008 of the prevalence of *C. trachomatis* and *N. gonorrhoea* in young people aged below 35 years in preventative penitentiary centres. The participating centres were Wad-Ras for women and Trinidad for young men.

478 young people aged below 35 years were included in the study, distributed between two age groups (older and younger than 25 years old) and stratified via penitentiary centre. The overall prevalence obtained for *C. Trachomatis* was 5.4%, whilst the prevalence of gonorrhoea was 0.2%. The prevalence of *C. Trachomatis* in those aged under 25 years was 5.2% (4.4% in women and 6% in men) and in those of foreign origin aged under 25 years it was 4.5% (p <0.5).

2.3.2. Injecting Drug Users (IDUs)

Within the behavioural monitoring studies which CEEISCAT has carried out since 1993, in the evaluation of 2008 the monitoring of STIs was included in the IDU group. With previous informed consent, urine samples were collected anonymously to determine the prevalence of *C. trachomatis* and *gonorrhoea,* respectively, using Real Time PCR (Abbott Real Time PCR CT/NG CE) (see section C).

Figure 2.2.4. HIV prevalence evolution in sentinel populations, high risk population. Catalonia, 1993-2008.



(1) 2008 data are derived from the European Study SIALON, which used the same recruitment centres as previous years.

Image 2.1. Preventive interventions to IDUs should adapt to their social and cultural context.

Figure 2.3.1. *Chlamydia trachomatis* and Neisseria gonorrhoeae prevalence in urine samples, recruited in harm reduction centres.

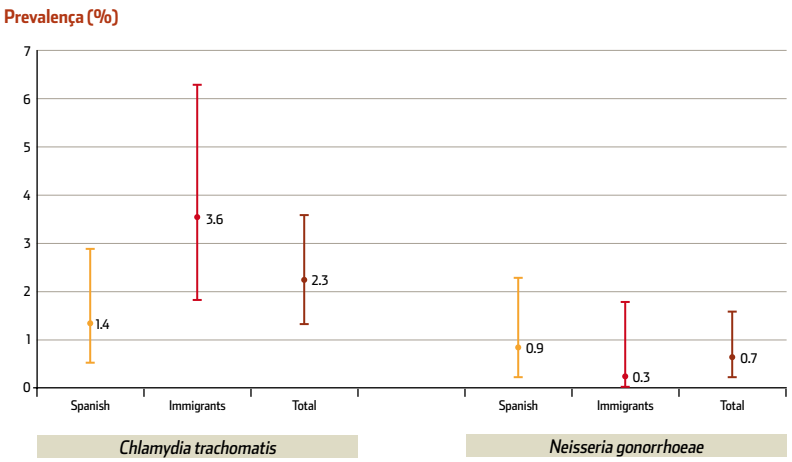
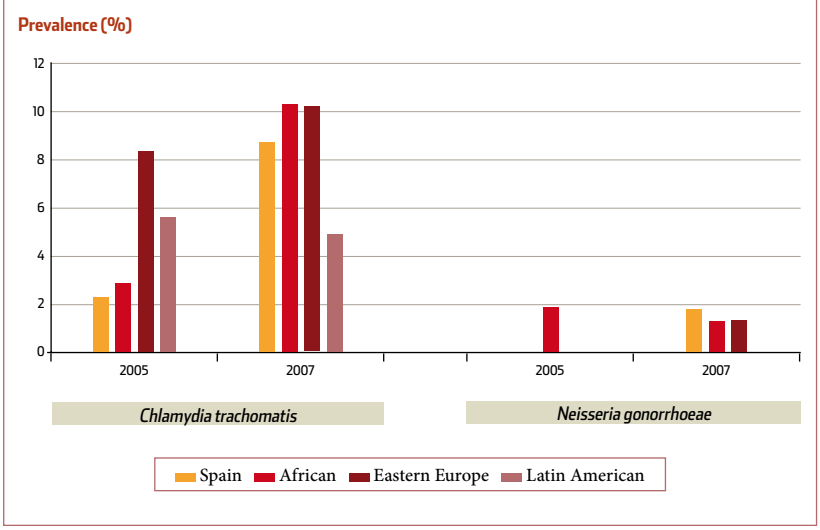


Figure 2.3.2. *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in FSW, Catalonia (2005-2007).



A total of 748 IDUs recruited in harm reduction centres participated in the study. 439 (58.7%) were Spanish, 176 (23.5%) were from Eastern European countries, 69 (9.2%) were from other European countries, 49 (6.6%) were from Africa and the rest were from the United States and the Middle East. The prevalence of *C. Trachomatis* in the samples of urine analysed was 2.3%, being higher amongst immigrant injectors (3.6%, p=0.049). No significant differences were observed in the prevalence of *N. gonorrhoea* between natives and immigrants, with an overall prevalence of 0.7% (**figure 2.3.1**).

2.3.3. Female Sex Workers (FSW)

In 2005 behavioural monitoring of FSW was initiated in Catalonia with the aim of monitoring the prevalence of HIV, STIs and the risk behaviours associated. In the two evaluations carried out (2005 and 2007), and with previously informed consent, urine samples were collected anonymously to estimate the prevalence of *C. trachomatis* and *N. gonorrhoea,* respectively, using Real Time PCR (Abbott Real Time PCR CT/CG CE).

Of the 400 women interviewed in 2007, 56 were Spanish (14%), 76 were African (19%), 105 were Latin American (26.3%) and 163 were from Eastern Europe (40.8%). The overall prevalence of *C. Trachomatis* in 2007 was 8.8% and in *N. gonorrhoea* it was 1% with no differences according to country of origin. Regarding the previous evaluation, the prevalence of *C. trachomatis* showed a significant increase, especially amongst African women (2.9% and 10.5%, respectively in 2005 and 2007) (**figure 2.3.2**).

↗ The estimated number of living people infected with HIV in Catalonia in 2008 was 34,957. Just as has been observed since 2001, there has been a slight increase, although not significant, with respect to the previous estimates, which justifies continuing surveillance and mandatory declaration.

↗ It is estimated that there are currently about 4,000 women of childbearing age, and at least 20% of

them were born outside of Spain. The prevalence observed in the latter group is significantly higher than that of Spanish women. The measures which guarantee access to health services for adequate prenatal control in this group in order to prevent the VT of HIV must be reinforced.

- The elevated prevalence of HIV observed in the IDU group along with the increase observed in the last few years in the number of injectors from other countries make it necessary not just to maintain preventative interventions directed at this group , but to adapt them to the group's social and cultural reality.

- Prevention programmes directed at the MSM group must be intensified and incorporate new risk reduction strategies, not just to avoid HIV infection but also other STIs.

- It is necessary to continue monitoring the prevalence of HIV and STIs in FSW given their elevated mobility and vulnerability to HIV. The cultural traits, irregular administrative situation and the difficulties in accessing help and resources justify additional efforts in the monitoring of this situation.

- Even though the prevalence of STIs seen in IDUs is not greater than that of the general population, the limited use of the condom reported in the behavioural surveys indicates the need to incorporate messages related to risk behaviour in prevention programmes.

- The elevated presence of *C. trachomatis* amongst the group of inmates aged below 25 years in Preventative Penitentiary Centres, justifies the monitoring of this infection and the implementation of effective interventions which permit the reduction of this prevalence.

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