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## **Dramatic decline in new HIV diagnoses in persons born in France in a large nationwide HIV cohort**

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## **Abstract**

### **Objectives**

Since trends in new HIV diagnoses represent a measure of the HIV epidemic, we conducted a 6-year longitudinal study to evaluate the change in rates of new HIV diagnosis, stratified by birthplace, HIV risk groups and CD4 cell count at diagnosis in a large French multicentre cohort.

**Study design** We performed a retrospective cohort study using data from the mainland French Dat' AIDS cohort.

**Methods:** Data were obtained for subjects with a new HIV diagnosis date between 2013 and 2018. HIV diagnosis date was defined as the date of the first known positive HIV serology.

**Results:** Between 2013 and 2018, a total of 68 376 **people living with HIV** (PLHIV) were followed in the Dat' AIDS cohort; 9543 persons were newly diagnosed with HIV. The annual number of new HIV diagnoses decreased from 1,856 in 2013, to 1,149 in 2018 (-38.1%),  $p=0.01$ ; it was more pronounced among subjects born in France, from 858 to 484 (-43.6%),  $p<0.01$  than in those born abroad (-23.8%, from 821 to 626,  $p=0.13$ ). Among subjects born in France, the decrease over the period was -46.7% among men who have sex with men (MSM), -43.5% for heterosexual women and -33.3% for heterosexual men.

**Conclusion:** Our findings show changes in HIV epidemiology in PLHIV born in France, with a decline around 40% in new HIV diagnoses, and a more pronounced decrease among MSM and heterosexual women. Our results support the long-term effectiveness of the ART as prevention strategy among the various tools for HIV prevention.

## Introduction

In 2013, the Joint United Nations Programme on HIV and AIDS (UNAIDS) adopted the 90–90–90 targets to reduce new HIV infection by 75% by 2030, compared to 2010 levels, by achieving the following targets: 90% of people living with HIV (PLHIV) diagnosed, 90% of diagnosed people on sustained combination antiretroviral therapy (cART), and among those on cART, 90% virologically controlled (with an undetectable HIV viral load)<sup>1</sup>. **According to UNAIDS, new HIV infections worldwide have declined by 23% since 2010, from 2.1 million [1.6 million–2.9 million] to 1.7 million [1.2 million–2.2 million] in 2019<sup>2</sup>. In Europe, the rate of new diagnoses declined by 32% between 2010 and 2019<sup>3</sup>. A numerous epidemiological studies have reported an association between increased cART coverage as well as an early initiation of cART and decreased HIV infection rates<sup>4–11</sup>.**

In France, among an estimated 156 600 PLHIV, 132 400 (85%) were already diagnosed in 2018, with a care cascade of approximately 85-91-97<sup>4</sup>. Universal ART (treatment-as-prevention, TasP) was recommended at the end of 2013 and pre-exposure prophylaxis (PrEP) in January 2016. Since trends in new HIV diagnoses are a measure of the HIV epidemic and could be impacted by the change in French HIV recommendations, we conducted a longitudinal study to evaluate the change in rates of new HIV diagnosis, stratified by birthplace, HIV risk groups and CD4 cell count at diagnosis between 2013 and 2018 in a large French multicentre cohort.

## Methods

### ***Data sources***

The Dat'AIDS cohort is a prospective French multicentre cohort of PLHIV that was established in 2000 <sup>12</sup>. As of December 31, 2018, it comprised 24 French public hospitals, including French overseas territories (the islands of Martinique and Guadeloupe in the Caribbean). Dat'AIDS covers about half of the PLHIV in care in France <sup>13</sup>. The cohort and its quality controls have previously been described elsewhere <sup>12</sup>. All patients provide written informed consent prior to the inclusion of their data <sup>12</sup>. The cohort is approved by the French national authority for the protection of privacy and personal data (Commission Nationale Informatique et Libertés) and is registered with Clinicaltrials.gov under the identifier NCT02898987.

The data from all 24 centres of the Dat'Aids cohort from January 1, 2013 to December 31, 2018 were analysed. The following variables were extracted: age at HIV diagnosis, gender, place of birth, risk categories for HIV infection, date of HIV diagnosis, primary HIV infection, AIDS status, and CD4 cell count at HIV diagnosis.

### ***Variable definitions***

HIV diagnosis date was defined as the date of the first known positive HIV serology. A primary HIV infection was defined as patients who were diagnosed with symptoms of acute retroviral syndrome and HIV seroconversion. A patient was considered to have AIDS at HIV diagnosis if the AIDS status was found 180 days before or after the HIV diagnosis date. CD4 cell count at HIV diagnosis was the closest measurement to the HIV diagnosis date. Since the information concerning the date of arrival in France was missing for most migrants, we used the place of birth to estimate the place of HIV infection, on the assumption that PLHIV born in France were more likely to have been infected in France. Our main analysis excluded the two centers in the French overseas territories as their HIV epidemiology differed from

mainland France.

### Main analysis

We summarize the data set using means and standard deviations for normally distributed quantitative variables, and median with first and third quartiles for non-normally distributed variables. Qualitative variables are described as number and percentage. Summaries were produced for the whole study period as well as for each individual year. In the yearly summaries, the numbers of HIV diagnoses are presented as well as the change compared to 2013 as a percentage (with + or – sign to indicate an increase or decrease respectively).

Referring centers stayed the same over the time.

The yearly number of HIV diagnoses and the change versus 2013 for PLHIV with CD4 cell count at diagnosis above or below 350 cells/mm<sup>3</sup> are reported only for the three main HIV exposure groups, namely: men who have sex with men (MSM), heterosexual women and heterosexual men. All analyses were performed for all PLHIV, and also by separating PLHIV by place of birth (born in France, born abroad or birthplace unknown) and by contamination route. The Mann Kendall test of trend was used to assess the likelihood of the observed changes in the yearly number of HIV diagnoses in our different groups.

### Results

Among the 68 376 PLHIV included in the Dat'AIDS cohort, a total of 9 543 PLHIV were newly diagnosed with HIV between January 1, 2013 and December 31, 2018. The main characteristics of these PLHIV are presented in Table 1. Most were male (71.2%), while almost half were MSM (45.7%) and born abroad (49.6%). At HIV diagnosis, the mean age was 36.3 ± 12.3 years and the median CD4 cell count 363/mm<sup>3</sup> (197-541). PLHIV presented primary HIV infection and AIDS diagnosis in 10.6% and 13.2% of cases, respectively.

Among PLHIV born in France (n=4 253), 90% were male and 70.5% were MSM. Among PLHIV born abroad (n=4 737), most were heterosexual women (39.1%) and heterosexual men (23.0%). The annual number of new HIV diagnosis decreased from 1856 in 2013 to 1149 in 2018 (-38.1%), p=0.01. The decrease was more pronounced among PLHIV born in France (-43.6%, from 858 to 484), p<0.01 than in those born abroad (-23.8%, from 821 to 626), p=0.13 (Table 2).

Among PLHIV born in France, a similar decrease was observed among MSM, from 602 to 321 (-46.7%), p<0.01 and heterosexual women (from 85 to 48; -43.5%), p=0.09 (Table 3). The decrease was of lesser magnitude in heterosexual men (from 114 to 76; -33.3%), p=0.26. In contrast, the values seem to fluctuate around the 2013 values without a clear trend among PLHIV born abroad (Table 4). Furthermore, among PLHIV born abroad, a decrease in new diagnoses has only been observed since 2017, and was greater among heterosexual women and men compared to MSM.

The annual number of primary HIV infections decreased from 222 in 2013 to 108 in 2018 (-51.4%); the rate was similar between PLHIV born in France (from 161 to 89; -44.7%) and those born abroad (from 36 to 18; -50.0%). A decline in AIDS status at HIV diagnosis was observed in all PLHIV (from 287 to 132; -54.0%) (Table 2).

The number of PLHIV with CD4 cell count  $\leq 200/\text{mm}^3$  at HIV diagnosis declined among PLHIV born in France (from 146 to 108; -26.0%) but remained stable among PLHIV born abroad (from 191 to 180; -5.8%). Among PLHIV born in France, a decrease for all groups of CD4 distribution was observed. However, the decrease was more marked in PLHIV with CD4 counts  $>350 \text{ cells}/\text{mm}^3$  at HIV diagnosis (-45.6%). In contrast, no similar clear trend was observed among PLHIV born abroad.



## DISCUSSION

A decrease of over 40% in new HIV diagnoses over the last 6 years (2013-2018) among MSM and heterosexual women, and a decrease of around 30% among heterosexual men born in France was observed in the Dat'AIDS cohort. Furthermore, this decrease was mostly observed among overall PLHIV with primary HIV infection and PLHIV born in France with CD4 cell count  $> 350/\text{mm}^3$  at HIV diagnosis. In contrast, the overall decrease in new HIV diagnoses among PLHIV born abroad was lower (-23.8%).

In this large French multicenter cohort of over 68 000 PLHIV followed in routine practice in France, the 3rd UN target (90% patients on cART with viral suppression) was reached in 2013, while the 2<sup>nd</sup> target (90% of diagnosed individuals on sustained cART) was achieved in 2014<sup>5</sup>. Furthermore, since 2013, the median time from HIV diagnosis to cART initiation had also dramatically decreased, with 88% of new PLHIV having initiated cART within the first three months in 2017<sup>5</sup>. Concomitantly to the improvements in the HIV care continuum, we observed a reduction of overall new HIV diagnoses among PLHIV born in France followed in this cohort, particularly among PLHIV with CD4 cell count  $\geq 350/\text{mm}^3$  at diagnosis. This decline is observed despite an increase in both HIV testing and sexually transmitted diseases over the same period in France<sup>14,15</sup>.

It is noteworthy that in PLHIV born in France, the median CD4 cell count at diagnosis seems to have decreased over time (from  $425/\text{mm}^3$  [259 - 619] in 2013 to  $380/\text{mm}^3$  [214 - 578] in 2018). However, this decrease is likely explained by the greater decrease in the number of PLHIV with CD4 cell count  $\geq 350/\text{mm}^3$  at diagnosis (-45.6%) than PLHIV with CD4 cell count  $< 350/\text{mm}^3$  (-30.4%). Indeed, the absolute numbers of PLHIV with AIDS status and of PLHIV with CD4 cell count  $\leq 200/\text{mm}^3$  at HIV diagnosis decreased during this period from

117 (13.6%) to 60 (12.4%) and from 150 (19.3%) to 109 (23.7%) patients, respectively. Nevertheless, delayed HIV diagnosis cannot be ruled out.

Our results are in line with occidental population-based studies reporting that TasP reduces new infections by 30% to 60%<sup>6-10,16</sup>. In particular, the decline in new HIV diagnoses among MSM in France is in line with the decline observed in 2017 in other European countries, such as Austria, Belgium, Denmark, the Netherlands, Norway, Spain and the United Kingdom<sup>11</sup>. The decline in new HIV could also be partly attributed to PrEP<sup>17</sup>. Indeed, the rate of decline in new HIV diagnoses among MSM born in France has accelerated since 2016. However, the impact of PrEP itself is difficult to assess. A simulation study found that PrEP at 25% uptake among high risk MSM in the United States resulted in the prevention of 30% of infections, if no other prevention strategies are employed<sup>18</sup>. In contrast, in the presence of TasP, condom use and seroadaptive behaviours (i.e., serosorting and seropositioning), PrEP at 25% uptake would further reduce infections by only an additional 5.1%<sup>18</sup>. It should be noted that only 10 405 persons received PrEP between January 1, 2016 and June 30, 2018 in France; 97.7% of them were men<sup>19</sup>. Furthermore, although MSM represent the biggest French population with new HIV diagnosis (70.5% in our study), the same decline in new HIV diagnosis was observed in heterosexual women born in France, while less than 3% of persons receiving PrEP were women.

Post-migration HIV acquisition has been estimated to occur in one third to half of sub-Saharan African migrants living in France, between 2012 and 2013<sup>20</sup>. In the UK, it has been estimated that 33% of heterosexual adults born abroad, and diagnosed with HIV between 2004 and 2010, acquired HIV while living in the UK<sup>21</sup>. In both countries, post-migration HIV acquisition was higher among men<sup>20,21</sup>. In our study, an overall decrease in new HIV diagnoses among PLHIV born abroad (-23.8%) was observed, but without any clear trend among HIV risk categories or groups of CD4 distribution, in particular PLHIV with CD4 cell

count  $> 350/\text{mm}^3$  at HIV diagnosis. Furthermore, this decrease was mainly observed since 2017. Since the information about the date of arrival in France was not available for most migrants, it is not possible to ascertain whether this decline is related to the change in French HIV recommendations and the potential impact on post-migration HIV acquisition, and to changing patterns of migration. Finally, lack of clear decrease in new HIV diagnoses among PLHIV born abroad may be secondary to a better HIV testing due to mandatory medical check-ups for migrants.

The major strength of this study is that it provides up-to-date data with no reporting delay, from a large nationwide prospective cohort of over 9 000 PLHIV with new HIV diagnoses followed in routine practice in 22 major HIV treatment centers in mainland France. Limitations include firstly, the use of the place of birth to estimate the place of HIV infection, on the assumption that PLHIV are more likely to have been infected locally. Second, true HIV incidence is unknown, as our data do not include PLHIV whose HIV is not yet diagnosed and also do not include all new HIV diagnoses in France or PLHIV not retained in care. Indeed, although PLHIV of our cohort represent around half of the PLHIV followed in France, only 24 out of 70 French general or university hospitals participate in our cohort <sup>13,22</sup>. Finally, changes in new HIV diagnosis is also related to the time between infection and HIV diagnosis which varied among HIV exposure categories <sup>23</sup>. However, this delay is shorter among MSM than among others HIV exposure categories in France <sup>23</sup>.

Conclusion: The epidemiology of HIV in PLHIV born in France has changed in our cohort, with a decline of over 40% in new HIV diagnoses in MSM and heterosexual women since 2013. Our results support the long-term effectiveness of TasP among the various tools for HIV prevention.

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**Author's contributions:** ALG and FBS participated in the design of the study protocol. ALG, AC, CD, PP, CJ, MH, CD, OZ, LC, FR and FBS participated in the data collection. ALG performed the data management and statistical analyses. ALG and FBS wrote the first manuscript draft. ALG, AC, CD, PP, CJ, MH, CD, OZ, LC, FR and FBS participated in interpretation of the data and writing of the final manuscript and all authors have read and approved the final manuscript. FBS was responsible for the overall supervision of the study.

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**Table 1: Characteristics of the 9 543 persons with newly diagnosed HIV, 2013-2018**

	<b>All N=9 543</b>	<b>Born in France N=4 253</b>	<b>Born Abroad N=4 737</b>	<b>Birthplace Unknown N=553</b>
Age at HIV diagnosis (years)	36.3 ± 12.3	37.5 ± 13.0	35.2 ± 11.4	36.9 ± 12.7
Male	6 799 (71.2%)	3 833 (90.1%)	2 495 (52.7%)	471 (85.2%)
Exposure group				
MSM	4 357 (45.7%)	3 000 (70.5%)	1 038 (21.9%)	319 (57.7%)
Heterosexual women	2 280 (23.9%)	362 (8.5%)	1 852 (39.1%)	66 (11.9%)
Heterosexual men	1 761 (18.5%)	580 (13.6%)	1 091 (23.0%)	90 (16.3%)
Other/Unknown	1 019 (10.7%)	273 (6.4%)	683 (14.4%)	63 (11.4%)
IDU	126 (1.3%)	38 (0.9%)	73 (1.5%)	15 (2.7%)
CD4 count at HIV diagnosis	365 [200 - 544]	415 [251 - 600]	306 [159 - 476]	394 [210 - 597]
≤200 CD4 cells/mm <sup>3</sup> at HIV diagnosis	2 049 (25.2%)	756 (19.3%)	1 184 (31.4%)	109 (23.9%)
>350 CD4 cells/mm <sup>3</sup> at HIV diagnosis	4 258 (52.3%)	2 376 (60.7%)	1 617 (42.9%)	265 (58.1%)
Primary HIV infection	1 009 (10.6%)	747 (17.6%)	190 (4.0%)	72 (13.0%)
AIDS at HIV diagnosis	1 262 (13.2%)	476 (11.2%)	707 (14.9%)	79 (14.3%)

**Note:** Units: Number (percentage); Median [First Quartile - Third Quartile]

MSM, men who have sex with men; IDU, intravenous drug users; HIV, human immunodeficiency virus.

**Table 2: Characteristics of new HIV diagnosis by year of diagnosis and place of birth**

	2013	2014	2015	2016	2017	2018	p-value†
All*	<b>1 856</b> (+0.0%)	<b>1 783</b> (-3.9%)	<b>1 673</b> (-9.9%)	<b>1 643</b> (-11.5%)	<b>1 439</b> (-22.5%)	<b>1 149</b> (-38.1%)	<b>0.01</b>
Age at HIV diagnosis (years)	35.7 ± 12.1	35.8 ± 11.9	36.5 ± 12.1	36.4 ± 12.3	36.6 ± 12.6	37.4 ± 12.8	
Primary HIV infection	222 (12.0%)	176 (9.9%)	160 (9.6%)	191 (11.6%)	152 (10.6%)	108 (9.4%)	
AIDS at HIV diagnosis	287 (15.5%)	224 (12.6%)	227 (13.6%)	212 (12.9%)	180 (12.5%)	132 (11.5%)	
CD4 count at HIV diagnosis	377 [202 - 573]	380 [212 - 555]	364 [201 - 541]	366 [205 - 540]	348 [194 - 518]	346 [178 - 520]	
≤200 CD4 cells/mm <sup>3</sup> at HIV diagnosis	379 (24.9%)	339 (23.2%)	341 (24.9%)	355 (24.7%)	330 (26.0%)	305 (28.2%)	
>350 CD4 cells/mm <sup>3</sup> at HIV diagnosis	829 (54.5%)	807 (55.3%)	716 (52.3%)	750 (52.1%)	626 (49.3%)	530 (49.0%)	
Born in France*	<b>858</b> (+0.0%)	<b>780</b> (-9.1%)	<b>775</b> (-9.7%)	<b>722</b> (-15.9%)	<b>634</b> (-26.1%)	<b>484</b> (-43.6%)	<b>&lt; 0.01</b>
Age at HIV diagnosis (years)	36.6 ± 12.7	35.7 ± 12.5	37.3 ± 12.7	37.9 ± 13.3	39.0 ± 13.6	39.8 ± 13.6	
Primary HIV infection	161 (18.8%)	128 (16.4%)	122 (15.7%)	140 (19.4%)	107 (16.9%)	89 (18.4%)	
AIDS at HIV diagnosis	117 (13.6%)	63 (8.1%)	91 (11.7%)	81 (11.2%)	64 (10.1%)	60 (12.4%)	
CD4 count at HIV diagnosis	424 [258 - 619]	432 [282 - 628]	416 [232 - 596]	430 [246 - 606]	394 [261 - 574]	384 [215 - 580]	
≤200 CD4 cells/mm <sup>3</sup> at HIV diagnosis	150 (19.3%)	104 (14.9%)	133 (18.8%)	142 (21.0%)	118 (19.6%)	109 (23.7%)	
>350 CD4 cells/mm <sup>3</sup> at HIV diagnosis	482 (62.1%)	460 (66.1%)	412 (58.4%)	412 (60.9%)	348 (57.8%)	262 (57.0%)	
Born Abroad*	<b>821</b> (+0.0%)	<b>876</b> (+6.7%)	<b>808</b> (-1.6%)	<b>852</b> (+3.8%)	<b>754</b> (-8.2%)	<b>626</b> (-23.8%)	<b>0.13</b>
Age at HIV diagnosis (years)	34.6 ± 11.4	35.6 ± 11.3	35.9 ± 11.4	35.3 ± 11.2	34.4 ± 11.1	35.5 ± 11.9	
Primary HIV infection	36 (4.4%)	33 (3.8%)	30 (3.7%)	39 (4.6%)	34 (4.5%)	18 (2.9%)	
AIDS at HIV diagnosis	148 (18.0%)	145 (16.6%)	121 (15.0%)	120 (14.1%)	108 (14.3%)	65 (10.4%)	
CD4 count at HIV diagnosis	305 [140 - 490]	312 [146 - 481]	304 [165 - 471]	317 [174 - 480]	299 [150 - 445]	302 [168 - 479]	
≤200 CD4 cells/mm <sup>3</sup> at HIV diagnosis	205 (34.5%)	206 (31.2%)	186 (31.2%)	198 (28.1%)	204 (32.4%)	185 (31.7%)	
>350 CD4 cells/mm <sup>3</sup> at HIV diagnosis	252 (42.4%)	289 (43.8%)	265 (44.5%)	306 (43.4%)	254 (40.4%)	251 (43.1%)	
Birthplace Unknown*	<b>177</b> (+0.0%)	<b>127</b> (-28.2%)	<b>90</b> (-49.2%)	<b>69</b> (-61.0%)	<b>51</b> (-71.2%)	<b>39</b> (-78.0%)	<b>&lt; 0.01</b>
Age at HIV diagnosis (years)	36.6 ± 12.1	37.3 ± 12.6	34.9 ± 13.3	35.9 ± 12.5	39.5 ± 14.9	39.6 ± 11.3	
Primary HIV infection	25 (14.1%)	15 (11.8%)	8 (8.9%)	12 (17.4%)	11 (21.6%)	1 (2.6%)	
AIDS at HIV diagnosis	22 (12.4%)	16 (12.6%)	15 (16.7%)	11 (15.9%)	8 (15.7%)	7 (17.9%)	
CD4 count at HIV diagnosis	402 [266 - 604]	394 [193 - 554]	415 [122 - 524]	368 [188 - 658]	398 [266 - 663]	335 [184 - 600]	
≤200 CD4 cells/mm <sup>3</sup> at HIV diagnosis	24 (16.0%)	29 (28.2%)	22 (32.8%)	15 (25.9%)	8 (20.0%)	11 (28.9%)	
>350 CD4 cells/mm <sup>3</sup> at HIV diagnosis	95 (63.3%)	58 (56.3%)	39 (58.2%)	32 (55.2%)	24 (60.0%)	17 (44.7%)	

Note: \* Number of diagnoses (Change from 2013)

† Mann Kendall test of trend

Units: Number (percentage); Median [First Quartile - Third Quartile]



**Table 3 - Characteristics of new HIV diagnosis among PLHIV born in France by year of diagnosis and by risk categories for HIV infection**

<b>Born in France</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>p-value†</b>
<b>MSM*</b>	<b>602</b>	<b>570</b>	<b>556</b>	<b>518</b>	<b>433</b>	<b>321</b>	<b>&lt; 0.01</b>
	<b>(+0.0%)</b>	<b>(-5.3%)</b>	<b>(-7.6%)</b>	<b>(-14.0%)</b>	<b>(-28.1%)</b>	<b>(-46.7%)</b>	
Primary HIV infection	127 (21.1%)	102 (17.9%)	94 (16.9%)	111 (21.4%)	79 (18.2%)	76 (23.7%)	
AIDS at HIV diagnosis	64 (10.6%)	23 (4.0%)	51 (9.2%)	48 (9.3%)	34 (7.9%)	35 (10.9%)	
CD4 count at HIV diagnosis							
≤200 cells/mm <sup>3</sup>	80 (13.3%)	56 (9.8%)	70 (12.6%)	84 (16.2%)	63 (14.5%)	54 (16.8%)	
200-350 cells/mm <sup>3</sup>	105 (17.4%)	82 (14.4%)	114 (20.5%)	89 (17.2%)	90 (20.8%)	62 (19.3%)	
350-500 cells/mm <sup>3</sup>	122 (20.3%)	152 (26.7%)	115 (20.7%)	109 (21.0%)	107 (24.7%)	75 (23.4%)	
>500 cells/mm <sup>3</sup>	231 (38.4%)	215 (37.7%)	198 (35.6%)	195 (37.6%)	144 (33.3%)	114 (35.5%)	
Unknown	64 (10.6%)	65 (11.4%)	59 (10.6%)	41 (7.9%)	29 (6.7%)	16 (5.0%)	
<b>Heterosexual Women*</b>	<b>85</b>	<b>59</b>	<b>58</b>	<b>53</b>	<b>59</b>	<b>48</b>	<b>0.09</b>
	<b>(+0.0%)</b>	<b>(-30.6%)</b>	<b>(-31.8%)</b>	<b>(-37.6%)</b>	<b>(-30.6%)</b>	<b>(-43.5%)</b>	
Primary HIV infection	14 (16.5%)	7 (11.9%)	11 (19.0%)	9 (17.0%)	8 (13.6%)	5 (10.4%)	
AIDS at HIV diagnosis	17 (20.0%)	8 (13.6%)	9 (15.5%)	9 (17.0%)	2 (3.4%)	2 (4.2%)	
CD4 count at HIV diagnosis							
≤200 cells/mm <sup>3</sup>	18 (21.2%)	13 (22.0%)	15 (25.9%)	17 (32.1%)	9 (15.3%)	12 (25.0%)	
200-350 cells/mm <sup>3</sup>	11 (12.9%)	12 (20.3%)	9 (15.5%)	8 (15.1%)	16 (27.1%)	8 (16.7%)	
350-500 cells/mm <sup>3</sup>	18 (21.2%)	7 (11.9%)	5 (8.6%)	8 (15.1%)	8 (13.6%)	12 (25.0%)	
>500 cells/mm <sup>3</sup>	27 (31.8%)	15 (25.4%)	22 (37.9%)	18 (34.0%)	22 (37.3%)	11 (22.9%)	
Unknown	11 (12.9%)	12 (20.3%)	7 (12.1%)	2 (3.8%)	4 (6.8%)	5 (10.4%)	
<b>Heterosexual Men*</b>	<b>114</b>	<b>91</b>	<b>108</b>	<b>92</b>	<b>99</b>	<b>76</b>	<b>0.26</b>
	<b>(+0.0%)</b>	<b>(-20.2%)</b>	<b>(-5.3%)</b>	<b>(-19.3%)</b>	<b>(-13.2%)</b>	<b>(-33.3%)</b>	
Primary HIV infection	16 (14.0%)	11 (12.1%)	12 (11.1%)	12 (13.0%)	17 (17.2%)	7 (9.2%)	
AIDS at HIV diagnosis	23 (20.2%)	18 (19.8%)	21 (19.4%)	13 (14.1%)	19 (19.2%)	11 (14.5%)	
CD4 count at HIV diagnosis							
≤200 cells/mm <sup>3</sup>	34 (29.8%)	22 (24.2%)	27 (25.0%)	22 (23.9%)	28 (28.3%)	25 (32.9%)	
200-350 cells/mm <sup>3</sup>	12 (10.5%)	23 (25.3%)	27 (25.0%)	20 (21.7%)	21 (21.2%)	16 (21.1%)	
350-500 cells/mm <sup>3</sup>	24 (21.1%)	16 (17.6%)	18 (16.7%)	21 (22.8%)	23 (23.2%)	9 (11.8%)	
>500 cells/mm <sup>3</sup>	29 (25.4%)	24 (26.4%)	24 (22.2%)	23 (25.0%)	18 (18.2%)	22 (28.9%)	
Unknown	15 (13.2%)	6 (6.6%)	12 (11.1%)	6 (6.5%)	9 (9.1%)	4 (5.3%)	

Note: \* Number of diagnoses (Change from 2013)

† Mann Kendall test of trend

Note: Units: Number (percentage)

**Table 4 - Characteristics of new HIV diagnosis among PLHIV born abroad by year of diagnosis and by risk categories for HIV infection**

Born Abroad	2013	2014	2015	2016	2017	2018	p-value†
<b>MSM*</b>	<b>172</b> (+0.0%)	<b>177</b> (+2.9%)	<b>201</b> (+16.9%)	<b>181</b> (+5.2%)	<b>166</b> (-3.5%)	<b>141</b> (-18.0%)	<b>0.46</b>
Primary HIV infection	20 (11.6%)	19 (10.7%)	15 (7.5%)	16 (8.8%)	23 (13.9%)	15 (10.6%)	
AIDS at HIV diagnosis	17 (9.9%)	15 (8.5%)	25 (12.4%)	12 (6.6%)	7 (4.2%)	11 (7.8%)	
CD4 count at HIV diagnosis							
≤200 cells/mm <sup>3</sup>	31 (18.0%)	29 (16.4%)	27 (13.4%)	23 (12.7%)	21 (12.7%)	28 (19.9%)	
200-350 cells/mm <sup>3</sup>	19 (11.0%)	29 (16.4%)	39 (19.4%)	42 (23.2%)	37 (22.3%)	32 (22.7%)	
350-500 cells/mm <sup>3</sup>	27 (15.7%)	38 (21.5%)	36 (17.9%)	37 (20.4%)	35 (21.1%)	34 (24.1%)	
>500 cells/mm <sup>3</sup>	35 (20.3%)	40 (22.6%)	34 (16.9%)	44 (24.3%)	36 (21.7%)	35 (24.8%)	
Unknown	60 (34.9%)	41 (23.2%)	65 (32.3%)	35 (19.3%)	37 (22.3%)	12 (8.5%)	
<b>Heterosexual Women*</b>	<b>331</b> (+0.0%)	<b>342</b> (+3.3%)	<b>289</b> (-12.7%)	<b>354</b> (+6.9%)	<b>285</b> (-13.9%)	<b>251</b> (-24.2%)	<b>0.26</b>
Primary HIV infection	9 (2.7%)	5 (1.5%)	6 (2.1%)	11 (3.1%)	3 (1.1%)	2 (0.8%)	
AIDS at HIV diagnosis	51 (15.4%)	52 (15.2%)	37 (12.8%)	52 (14.7%)	46 (16.1%)	17 (6.8%)	
CD4 count at HIV diagnosis							
≤200 cells/mm <sup>3</sup>	78 (23.6%)	72 (21.1%)	62 (21.5%)	83 (23.5%)	82 (28.8%)	72 (28.7%)	
200-350 cells/mm <sup>3</sup>	67 (20.3%)	65 (19.0%)	53 (18.3%)	70 (19.8%)	67 (23.5%)	62 (24.7%)	
350-500 cells/mm <sup>3</sup>	41 (12.4%)	59 (17.3%)	43 (14.9%)	55 (15.6%)	47 (16.5%)	45 (17.9%)	
>500 cells/mm <sup>3</sup>	55 (16.7%)	48 (14.0%)	59 (20.4%)	60 (17.0%)	39 (13.7%)	47 (18.7%)	
Unknown	89 (27.0%)	98 (28.7%)	72 (24.9%)	85 (24.1%)	50 (17.5%)	25 (10.0%)	
<b>Heterosexual Men*</b>	<b>193</b> (+0.0%)	<b>229</b> (+18.7%)	<b>192</b> (-0.5%)	<b>180</b> (-6.7%)	<b>170</b> (-11.9%)	<b>127</b> (-34.2%)	<b>0.02</b>
Primary HIV infection	4 (2.1%)	7 (3.1%)	7 (3.6%)	7 (3.9%)	4 (2.4%)	1 (0.8%)	
AIDS at HIV diagnosis	45 (23.3%)	53 (23.1%)	28 (14.6%)	43 (23.9%)	32 (18.8%)	19 (15.0%)	
CD4 count at HIV diagnosis							
≤200 cells/mm <sup>3</sup>	56 (29.0%)	72 (31.4%)	54 (28.1%)	56 (31.1%)	52 (30.6%)	39 (30.7%)	
200-350 cells/mm <sup>3</sup>	25 (13.0%)	42 (18.3%)	31 (16.1%)	40 (22.2%)	40 (23.5%)	24 (18.9%)	
350-500 cells/mm <sup>3</sup>	24 (12.4%)	24 (10.5%)	27 (14.1%)	21 (11.7%)	21 (12.4%)	27 (21.3%)	
>500 cells/mm <sup>3</sup>	27 (14.0%)	33 (14.4%)	18 (9.4%)	24 (13.3%)	21 (12.4%)	22 (17.3%)	
Unknown	61 (31.6%)	58 (25.3%)	62 (32.3%)	39 (21.7%)	36 (21.2%)	15 (11.8%)	

Note: \* Number of diagnoses (Change from 2013)

† Mann Kendall test of trend

Note: Units: Number (percentage)