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**TITLE PAGE**

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**Has the employment status of people living with HIV changed since the early 2000s?***Running head: Changes in PLWHIV employment status*

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4 Tables and 1 Figure

1 Supplementary Table

**Abstract**

Objectives: In a context marked by major changes in the field of HIV and in the general socioeconomic context, this study aimed at investigating changes in the employment situation of people living with HIV (PLWHIV) in France since the early 2000s.

Design: Repeated cross-sectional survey among two nationally representative samples of PLWHIV followed at hospital in France in 2003 (N=2,932) and 2011 (N=3,022).

Methods: Differences between 2003 and 2011 in 1) rates of employment, unemployment and inactivity and 2) rates of work cessation and access to work following HIV diagnosis were measured using two-step multivariate Poisson regression models adjusted for individual socio-demographic determinants of position on the labor market, and then additionally for health status characteristics.

Results: Overall, among working-age PLWHIV 60.9% in 2003 and 59.6% in 2011 were employed; 12.6% and 15.8%, respectively, were unemployed; and 26.5% and 24.6%, respectively, were inactive. Adjusting for socio-demographic determinants of position on the labor market, while employment rate was not different in 2011 compared to 2003, inactivity rate significantly decreased (adjusted Prevalence Rate Ratio: 0.83, 95% Confidence Interval: [0.72-0.96]) and unemployment rate significantly increased (1.28 [1.04-1.57]). After additional adjustment for health status characteristics, the difference was no longer significant for inactivity (0.89 [0.77-1.03]) but remained significant for unemployment (1.55 [1.24-1.93]). Compared to 2003, in 2011 transitions to unemployment following HIV diagnosis tended to be more frequent (1.58 [0.92-2.68]) and access to work was significantly less frequent (0.57 [0.33-0.99]).

Conclusions: Improvements in HIV care have not translated into improvements in PLWHIV's situation regarding employment.

**Keywords:** Employment status; Disability; Socioeconomic factors; France; HIV infection

## Introduction

In the general population, work constitutes a central dimension of individuals living conditions by providing them with financial support, social status and identity [1]. In addition, employment status and, for those employed, working conditions and organization have major effects on health [2, 3]. Among people living with HIV (PLWHIV) as well, employment status has been shown to be an independent predictor of adherence to treatment, morbidity and mortality [4-7].

Studies conducted in various Western countries in the early 2000s provided evidence that early in the combined antiretroviral therapy (cART) era, HIV infection negatively affected individual chances of maintaining in and accessing/returning to employment [8-12]. This deleterious effect of HIV infection on employment was shown to occur from the very first months following disease onset [13] through various mechanisms including disease severity and HIV-related discrimination [14]. As in the general population, socio-demographic characteristics including age, sex, education, country of citizenship and family status constitute major determinants of PLWHIV's position on the labor market [11, 15]. HIV-infected women, migrants and drug users are particularly disadvantaged compared to men who have sex with men [11].

Major changes have occurred over the past decade, both in the field of HIV and in the broader general socioeconomic context, which may have resulted in changes in the burden of HIV infection on employment. First, the sustained use of cART has resulted in marked decreases in HIV-related morbidity and mortality [16, 17], but also in a rise in the frequency of various non-AIDS related conditions [18, 19] which substantially affect PLWHIV's chances of maintaining in employment [15]. Second, in addition to PLWHIV's ageing, the changing face of the HIV epidemics in Europe has resulted in increasing proportions of persons with a disadvantaged position on the labor market among PLWHIV - especially women and migrants originating from Sub-Saharan Africa [20, 21]. Third, the economic crisis of 2008 has had severe and long-lasting effects on employment throughout Europe [22], and people affected by a chronic condition may be particularly affected [23-25].

In this changing context, the present study aimed at investigating changes in PLWHIV's situation regarding employment since the early 2000s in France. More specifically, our objectives were to measure changes over time in 1) PLWHIV's rates of employment, unemployment and inactivity and 2) early labor market transitions following HIV diagnosis, accounting for changes in individuals' socio-demographic determinants of position on the labor market and health status. We hypothesized that the potentially beneficial effects of recent HIV care improvements on PLWHIV's situation regarding employment may have been counterbalanced by concurrent changes in the characteristics of the HIV epidemics and the general socioeconomic context.

## Methods

### *Study design*

The study was based on data of a repeated cross-sectional survey conducted among two large nationally representative samples of HIV-infected people followed at hospital in France in 2003 and 2011, with the primary aim of assessing the various dimensions of socioeconomic conditions and health of PLWHIV in France in their diversity and their changes over time. Both surveys were conducted among random samples of hospital outpatients aged 18 or older, diagnosed HIV-infected for at least 6 months, and either French-citizens or immigrants living in France for at least 6 months. The VESPA-2003 survey was conducted between December 2002 and September 2003 amongst 2,932 PLWHIV recruited in 102 hospital departments in mainland France. Its methodology has been extensively described elsewhere [26]. The VESPA-2011 survey was conducted between April 2011 and January 2012 amongst 3,022 PLWHIV recruited in 73 hospital departments in mainland France, using a similar design as detailed elsewhere [27]. In both surveys, participants answered a standardized questionnaire administered face-to-face by a trained interviewer including detailed questions on sociodemographic characteristics, living conditions, health and healthcare. To allow comparisons, a number of key questions were kept the same between surveys. Participants were additionally asked to complete a self-administered questionnaire including an assessment of health-related quality of life (HRQL) using generic scales from the Medical Outcomes Study (MOS): the 36-item Short-Form health survey instrument (SF-36) [28] in VESPA-2003 and its 12-item subset (SF-12) [29] in VESPA-2011. Both scales have been shown to have discriminant validity and to provide appropriate measures of HRQL. Clinical and laboratory information were documented from medical records.

Data were weighted to account for sampling design and non-participation. Details about the weighting procedure are provided elsewhere [27]. Both surveys received approval from the French Advisory Committee on Information Processing in Material Research in the Field of Health

(CCTIRS) and met the ethical requirements of the French National Commission for Computing and Liberties (CNIL).

### *Variables of interest*

Employment status at the time of interview was documented for all participants, based on similar questions in both surveys. In line with the definition of the International Labour Organization, employment status was categorized in two steps as follows. First, participants were considered employed if they reported having a job (either paid or voluntary), regardless of professional status and working time (full time/part time), or if they were on sick leave for less than 6 months. Then, among participants who were not employed, individuals were categorized as either unemployed if they reported having actively sought work within the preceding 3 months or inactive otherwise, including students, retirees, people on disability (recipients of a disability benefit or on sick leave for more than 6 months) and those with family responsibilities. In addition, employment status at the time of HIV diagnosis (employed or not) was documented for respondents diagnosed HIV-infected within the 36 months preceding the survey.

We considered socio-demographic characteristics (age, sex, citizenship, educational level and household composition) and lifetime history of intravenous drug use as indicators of socio-demographic determinants of individuals' position on the labor market. Educational level was measured using maximum attained level of education in VESPA-2003 and highest diploma obtained in VESPA-2011, and dichotomized as low (primary or secondary education in VESPA-2003; high school diploma or lower in VESPA-2011) or high (higher education in VESPA-2003; tertiary degree in VESPA-2011). Health status characteristics documented from medical records included indicators of HIV disease advancement (duration since HIV diagnosis at the time of the survey; immune status at the time of diagnosis; status regarding combination antiretroviral therapy (cART) and HIV viral load (VL) at the time of the survey) and information on history of Hepatitis C. For participants who completed the self-administered questionnaire, the physical

component summary (PCS) for physical HRQL and the mental component summary (MCS) for mental HRQL were computed using the 12 items common to the SF-12 and the SF-36 scales. These scores range from 0 to 100, with higher values denoting better HRQL. Impaired physical or mental HRQL was defined by a score below the first quartile of the distribution by age and sex in the French general population of, respectively, the PCS and the MCS [30].

### *Statistical Analyses*

Analyses included participants of the VESPA-2003 and VESPA-2011 surveys of working-age (25-64 years old) at the time of the survey and diagnosed HIV-infected in 1996 or later, i.e. in the era of cART availability. Individuals with missing information for variables with <1% missing values were excluded.

Employment, unemployment and inactivity rates (each expressed as a percentage of the whole study population) were estimated in 2003 and in 2011, overall and according to individuals' socio-demographic determinants of position on the labor market and health status characteristics. Adjusted prevalence rate ratios (aPRR) comparing overall employment, unemployment and inactivity rates between 2003 and 2011 were assessed using three separate multivariate Poisson regression models with a robust variance estimator [31]. Each model considered the whole study population and compared the probability of being, respectively, employed (vs. unemployed or inactive), unemployed (vs. employed or inactive), or inactive (vs. employed or unemployed) in 2011 versus 2003. In a first step, models were adjusted for individual socio-demographic determinants of position on the labor market, thus providing estimates of the comparison of PLWHIV's employment status between 2003 and 2011 controlling for changes in individuals profile over time. Then, in order to estimate whether changes in PLWHIV's health contributed to differences in employment status between 2003 and 2011, additional adjustment for health status characteristics was performed.



Labor market transitions following HIV diagnosis were assessed among the sub-sample of participants diagnosed HIV-infected within the 36 months preceding the survey in VESPA-2003 and VESPA-2011. Rates of work cessation (distinguishing between transitions from employment to *i*) unemployment and *ii*) inactivity) and access to work (transition from non-employment to employment) between HIV diagnosis and survey time were compared between 2003 and 2011, using multivariate Poisson regression models adjusted for individual socio-demographic determinants of position on the labor market and health status characteristics.

Individuals with unknown CD4 at time of diagnosis or unknown VL at time of the survey and those who did not complete the self-administered questionnaire were included in the analyses using missing categories for immune status at diagnosis, status regarding cART and VL at the time of the survey, and HRQL, respectively. Because these information may not be missing at random, we conducted sensitivity analyses assigning all participants with missing data for each of these three covariates to either the least favorable (ie,  $<200$  CD4/mm<sup>3</sup> or AIDS; not on ART; impaired physical and mental HRQL, respectively) or the most favorable situation (ie,  $\geq 500$  CD4/mm<sup>3</sup>; on ART and VL $<400$ /ml; normal physical and mental HRQL, respectively) in separate analyses.

All analyses were performed using Stata 12®(Stata Corporation, College Station, TX) and accounted for the complex sampling design and data weighting so that estimates are representative of the whole population of HIV-infected people followed at hospital in France.

## Results

### *Characteristics of the study population*

Of a total of 2,676 participants (1,010 participants of VESPA-2003 and 1,666 participants of VESPA-2011) of working-age at the time of interview and diagnosed HIV-infected in 1996 or later, 16 individuals with missing information on educational level (n=3) or Hepatitis C history (n=13) were excluded. The 2,660 participants included were predominantly men (64.8%); 28.0% were citizens of a country of sub-Saharan Africa and more than a third (36.2%) were men who have sex with men. As shown in Table 1, socio-demographic and health characteristics of PLWHIV differed between 2003 and 2011. As compared to 2003, in 2011 PLWHIV were older (median age: 43 versus 39 years,  $p<0.001$ ) and more frequently women (37.2% versus 32.1%,  $p=0.05$ ) and citizens of a country of sub-Saharan Africa (31.0% versus 22.9%,  $p<0.001$ ). In addition, in 2011 PLWHIV had been diagnosed HIV-positive for a longer time than in 2003 (median time since HIV diagnosis: 7.4 versus 3.8 years,  $p<0.001$ ), their CD4 cell count at diagnosis was higher (median: 358 versus 303,  $p <0.001$ ) and they were more frequently in virological success (83.2% versus 62.3%,  $p<0.001$ ).

### *Employment status at the time of the survey*

Overall, approximately six PLWHIV out of ten were employed in both surveys (60.9% in VESPA-2003 and 59.6% in VESPA-2011,  $p=0.56$ ). Among them, 6.2% and 4.7%, respectively, were on sick leave at the time of interview. The rate of unemployment increased by 3.2 points, from 12.6% in 2003 to 15.8% in 2011 (relative change: +25.2%,  $p=0.04$ ) and the rate of inactivity decreased by 1.9 points, from 26.5% to 24.6%, respectively (relative change: -7.2%,  $p=0.34$ ). Main reasons for inactivity were disability (almost half of the inactive in 2003 and 2011 – 47.0% and 48.4%, respectively,  $p=0.76$ ) and retirement (10.2% and 25.6%, respectively,  $p=0.001$ ).

As shown in Table 2, in 2003 and 2011 employment status markedly differed according to socio-demographic characteristics. Employment rates were the highest among men (67.0% in VESPA-2003 and 64.7% in VESPA-2011), French-nationals (67.6% and 63.9%, respectively), individuals aged 40-49 years (65.3% and 64.5%, respectively), those highly educated (72.5% and 71.6%, respectively) and those living in cohabiting partnership without children (71.6% and 66.1%, respectively). Unemployment was particularly high among women (16.4% and 21.0%, respectively in 2003 and 2011), individuals aged less than 40 years (14.9% and 22.5%, respectively) and those originating from sub-Saharan Africa (22.8% and 26.5%, respectively). Inactivity was particularly frequent among women (35.7% and 28.0%, respectively), non-African immigrants (42.2% and 35.1%, respectively), individuals aged 50 years or more (42.3% and 40.2%, respectively) and those low-educated (31.9% and 28.5%, respectively). History of intravenous drug use was also associated with high rates of inactivity (53.4% and 50.0%, respectively). Employment status additionally differed according to health status characteristics, with higher employment rates among individuals with the most favorable indicators regarding HIV disease advancement, comorbidity and health-related quality of life.

Adjusting for socio-demographic determinants of position on the labor market, the employment rate of PLWHIV was not different in 2011 as compared to 2003 (aPRR: 1.03, 95% Confidence Interval: 0.96 to 1.10). Though, the rate of inactivity significantly decreased between 2003 and 2011 (aPRR: 0.83, 95%CI: 0.72 to 0.96), and the rate of unemployment significantly increased (aPRR 1.28, 95%CI: 1.04 to 1.57) (Tables 3 and 4).

After additional adjustment for health status characteristics, the difference in inactivity rate between 2003 and 2011 was no longer significant (aPRR: 0.89, 95%CI: 0.77 to 1.03). In contrast, the unemployment rate remained significantly higher in 2011 compared to 2003 (aPRR: 1.55, 95%CI: 1.24 to 1.93). These results remained consistent in sensitivity analyses.

#### *Labor market transitions following HIV diagnosis*

A total of 427 participants in VESPA-2003 and 366 participants in VESPA-2011 had been diagnosed HIV-infected within the 36 months preceding the interview. These recently diagnosed individuals did not differ between 2003 and 2011 regarding socio-demographic determinants of position on the labor market (supplementary Table S1); though, compared to 2003 those included in 2011 were less likely to have reached an advanced stage of HIV disease at the time it was diagnosed (29.1% versus 37.6%,  $p=0.06$ ) and to have a history of Hepatitis C (3.0% versus 6.0%,  $p=0.06$ ), and more likely to be in virological success (69.7% versus 57.1%,  $p=0.007$ ).

Among recently diagnosed participants employed at the time of HIV diagnosis, 10.1% in VESPA-2003 and 19.2% in VESPA-2011 had turned unemployed by the time of interview ( $p=0.01$ ); and 14.8% and 15.4%, respectively, had become inactive ( $p=0.88$ ) (Figure 1). Adjusting for individuals' socio-demographic determinants of position on the labor market and health status characteristics, the rate of transition from employment to unemployment between times of HIV diagnosis and interview tended to be higher among participants of VESPA-2011 compared to participants of VESPA-2003 (aPRR: 1.58, 95%CI: 0.92 to 2.68). The rate of transition from employment to inactivity did not differ between participants of both surveys (aPRR: 1.05, 95%CI: 0.63 to 1.76).

Among recently diagnosed participants not employed at the time of HIV diagnosis, the proportion who had accessed employment by the time of interview was 29.0% in VESPA-2003 and 21.2% in VESPA-2011 (Figure 1). Adjusting for individuals' socio-demographic determinants of position on the labor market and health status characteristics, the rate of access to work between times of HIV diagnosis and interview was significantly lower among participants of VESPA-2011 compared to participants of VESPA-2003 (aPRR: 0.54, 95%CI: 0.32 to 0.90).

These results remained consistent in sensitivity analyses.

## Discussion

Our results indicate that in France, the employment rate of PLWHIV has remained consistently low over the past decade. Though, this apparent stability masks diverging trends over time in the labor market position of PLWHIV who are out of employment. Indeed, we found that between 2003 and 2011, while economic inactivity decreased, unemployment increased. This suggests that despite the major improvements in HIV care and treatments occurred over the past decade, the employment of PLWHIV, a population which is mainly made of working age people, still remains problematic in the current context and therefore deserves a special attention.

The VESPA-2003 and VESPA-2011 studies, because they were conducted at two different time points using similar study design and questions, provide unique datasets to investigate changes in PLWHIV health and living conditions over a period marked by major changes both in the field of HIV and more broadly in terms of socioeconomic, political and social context. The national-representative nature of the two datasets constitutes a major strength of our study, as well as the availability of detailed individual information allowing distinguishing between unemployment and economic inactivity and accounting for changes over time in PLWHIV's sociodemographic and health profiles. However, it should be acknowledged that the study is restricted to HIV-infected people attending hospital for HIV care. Nevertheless, HIV care is essentially provided at hospital in France and since 2006 the experts have recommended that all PLWHIV have at least an annual checkup at hospital [32], suggesting that our estimates are likely to apply to the vast majority of PLWHIV in care in France. In addition, the causal interpretation of our findings on changes over time should remain cautious, especially because analyses consisted of comparisons between two cross-sectional surveys rather than on individual longitudinal data. Furthermore, the changes we report among PLWHIV may partly reflect changes occurred more generally in the French general population. Investigating the proper role of HIV infection on these changes would have required a control group of HIV-negative individuals.

The employment rates of approximately 60% we report among PLWHIV in 2003 and 2011 are much lower than the corresponding rates in the French general population aged 20-64 years (69.7% in 2003 and 69.3% in 2011) [33]. This is consistent with previous studies which reported a lower employment rate among PLWHIV compared to the general population in France [15] as well as in other European countries including Denmark [34], Belgium [35], Spain [36] or UK [37]. In contrast, our findings provide evidence of high rates of both economic inactivity and unemployment among PLWHIV. The inactivity rates we report are substantially higher among PLWHIV aged 25-49 years compared to the French general population of similar age range (23% in 2003 and 18% in 2011 versus 12% and 11%, respectively, in the general population [38]), while among people aged 50-64 years figures appear less contrasted, reaching more than forty percent of individuals in this age category both among PLWHIV and in the general population (42% and 40% versus 43% and 41% [38], respectively). Even in the era of highly potent antiretroviral treatments, inactivity appears to be primarily driven by disability among PLWHIV, probably as a consequence of HIV disease itself but also comorbidities. Similarly, disability retirement was reported to be increased among PLWHIV compared to the general population in Denmark [34]. By providing evidence of high rates of unemployment among PLWHIV (12.6% in 2003 and 15.8% in 2011, compared to 5.7% and 6.1%, respectively, in the general population [38]), our results additionally suggest that the low employment rate of PLWHIV results not only from their exclusion from the labor market but also from a decreased employability of those who remain in the labor force.

We found that controlling for individual socio-demographic determinants of position on the labor market, the inactivity rate of PLWHIV, although persistently high, significantly decreased between 2003 and 2011. This decrease was no longer significant after accounting for health status characteristics, suggesting that it likely results from improvements in HIV care occurred over the study period. Such a finding, by providing evidence for PLWHIV's increased ability to work, is consistent with previous findings supporting the 'normalization' of PLWHIV's life in the era of

cART [39]. This decrease may also reflect changes in eligibility requirements for disability introduced in France in 2005 [40], which may have resulted in reduced access to disability benefits for PLWHIV. Yet, among participants of the VESPA studies the proportion of recipients of a disability benefit did not decrease between 2003 (15.7%) and 2011 (18.1%), suggesting that such changes are unlikely to explain the decrease in inactivity we report.

In contrast with inactivity figures, unemployment significantly increased between 2003 and 2011. Previous reports showed that adverse employment outcomes arise very early in the course of HIV disease [9, 10, 13, 15, 34]. Our results on early labor market transitions (i.e., within the first 36 months) following HIV diagnosis confirm the high frequency of such early changes; and furthermore suggest that the increase in unemployment we report is likely to result from lower chances of both maintaining in employment and accessing (or returning) to work in 2011 compared to 2003. This may be related to various underlying mechanisms. First, the increase we report in terms of adverse labor market transitions may result from the overall deterioration of the economic situation generally affecting the French labor market since 2008 [38]. Second, this may reflect the increasing burden of comorbidities, including e.g. cardiovascular disease or depression, which have been shown to impair PLWHIV's employment status [15]. Indeed, in our study although analyses were adjusted for health status as measured by HIV disease advancement, hepatitis C coinfection and health-related quality of life, differences in comorbidities over time could not be accounted for since the information was not available in the 2003 survey. Third, experiences of discrimination related either to HIV status or other characteristics of the individuals, which constitute independent predictors of employment loss among PLWHIV [14], were very frequent in France in 2011. Indeed, 24% of the VESPA-2011 respondents having applied for a job reported having been discriminated against when seeking a job in the past two years, and 6% of the participants reported experiences of discrimination in their work environment (if any) [41]. Though, because comparable figures were not available in the VESPA-2003 study, we were not able to measure their contribution to the reported trends.

In conclusion, our study suggests that improvements in HIV care occurred since the early 2000s have not translated into improvements in PLWHIV's situation regarding employment. Although PLWHIV have seen their ability to work increased in the recent years, these improvements appear to have been offset by increasing barriers to maintain in and/or access to employment. The respective roles of socioeconomic recession, comorbidities and discrimination deserve to be further investigated to help address the issue of employment of PLWHIV in the current context.



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**Competing interests**

The authors have no competing interest to declare.

**Author Contributions**

MA, FL and RDS contributed to the study design, data interpretation and manuscript preparation. MA conducted statistical analyses. MA and RDS drafted the manuscript. FL and BS critically revised the manuscript.

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**Table 1. Participants' socio-demographic determinants of position on the labor market and health status characteristics, VESPA-2003 and VESPA-2011 surveys**

	VESPA-2003 <sup>a</sup> (N=1,010)	VESPA-2011 <sup>a</sup> (N=1,650)	P-value <sup>b</sup>
<i>Socio-demographic determinants of position on the labor market</i>			
Sex			
Men	67.9	62.8	0.046
Women	32.1	37.2	
Age (years)			
25-39	52.4	35.1	<0.001
40-49	29.5	35.9	
50-64	18.1	29.0	
Country of citizenship			
France	67.2	62.4	<0.001
Sub-Saharan Africa	22.9	31.0	
Other	9.9	6.6	
Educational level			
High	31.1	29.1	0.33
Low	68.9	70.9	
Household composition			
Single, no children	37.7	37.1	0.52
Single with children	9.6	11.8	
Cohabiting partner, no children	23.9	23.2	
Cohabiting partner and children	16.3	17.0	
Other cohabiting adults	12.5	10.9	
History of intravenous drug use			
No	94.2	94.1	0.91
Yes	5.8	5.9	
<i>Health status</i>			
Duration since HIV diagnosis			
Less than 3 years	39.1	17.9	<0.001
3 years or more	60.9	82.1	
Immune status at HIV diagnosis			
<200 CD4/mm <sup>3</sup> or AIDS	33.1	28.5	0.007
200-349 CD4/mm <sup>3</sup>	19.4	16.6	
350-499 CD4/mm <sup>3</sup>	13.5	18.1	
≥500 CD4/mm <sup>3</sup>	23.1	22.9	
Missing	10.9	13.9	
ART status and HIV viral load (VL)			
On ART, VL <400 copies/ml	62.3	83.2	<0.001
On ART, VL ≥400 copies/ml	12.1	4.2	
Not on ART	23.0	10.3	
Missing	2.6	2.3	
History of Hepatitis C			
No	90.3	92.1	0.15
Yes	9.7	7.9	
Health-Related Quality of Life (HRQL)			
Normal	22.1	21.4	<0.001
Impaired mental HRQL	12.0	8.4	
Impaired physical HRQL	15.6	22.5	
Impaired physical and mental HRQL	16.3	20.0	
Missing	34.0	27.7	

<sup>a</sup> Weighted percentages<sup>b</sup> Chi-square test

**Table 2. Employment status according to participants' socio-demographic determinants of position on the labor market and health status characteristics, VESPA-2003 and VESPA-2011 surveys**

	VESPA-2003				VESPA-2011			
	% <sup>a</sup> Employed	% <sup>a</sup> Unemployed	% <sup>a</sup> Inactive	<i>P</i> - <i>value</i> <sup>b</sup>	% <sup>a</sup> Employed	% <sup>a</sup> Unemployed	% <sup>a</sup> Inactive	<i>P</i> - <i>value</i> <sup>b</sup>
<i>Socio-demographic determinants of position on the labor market</i>								
Sex								
Men	67.0	10.8	22.2	<0.001	64.7	12.6	22.6	<0.001
Women	47.9	16.4	35.7		51.0	21.0	28.0	
Age (years)								
25-39	61.4	14.9	23.7	<0.001	61.3	22.5	16.2	<0.001
40-49	65.3	12.4	22.2		64.5	15.3	20.2	
50-64	51.7	5.9	42.3		51.6	8.3	40.2	
Country of citizenship								
France	67.6	9.2	23.1	<0.001	63.9	10.0	26.1	<0.001
Sub-Saharan Africa	47.6	22.8	29.6		54.2	26.5	19.4	
Other	45.7	12.1	42.2		44.0	20.8	35.1	
Educational level								
High	72.5	12.7	14.7	<0.001	71.6	13.0	15.4	<0.001
Low	55.5	12.6	31.9		54.6	16.9	28.5	
Household composition								
Single, no children	64.2	9.7	26.1	<0.001	59.4	13.9	26.8	<0.001
Single with children	42.4	15.6	42.0		45.6	31.7	22.7	
Cohabiting partner, no children	71.6	9.1	19.3		66.1	8.2	25.7	
Cohabiting partner and children	59.4	16.1	24.5		63.8	15.9	20.2	
Other cohabiting adults	46.1	21.6	32.3		55.3	20.7	24.0	
History of intravenous drug use								
No	62.7	12.5	24.8	<0.001	61.2	15.7	23.1	0.02
Yes	32.3	14.3	53.4		33.7	16.3	50.0	
<i>Health status</i>								
Duration since HIV diagnosis								
Less than 3 years	56.0	16.4	27.5	0.01	56.3	24.8	18.9	<0.001
3 years or more	64.0	10.2	25.8		60.3	13.8	25.8	
Immune status at HIV diagnosis								
<200 CD4/mm <sup>3</sup> or AIDS	57.1	10.0	32.9	0.004	50.6	17.1	32.3	<0.001
200-349 CD4/mm <sup>3</sup>	58.6	15.5	25.8		61.0	17.4	21.5	
350-499 CD4/mm <sup>3</sup>	64.8	10.8	24.4		70.0	11.0	18.9	

≥500 CD4/mm <sup>3</sup>	69.9	12.9	17.1		63.0	15.4	21.6	
ART status and HIV viral load (VL)								
On ART, VL <400 copies/ml	64.0	11.0	25.0	0.03	60.8	14.1	25.0	0.01
On ART, VL ≥400 copies/ml	48.6	16.6	34.8		48.8	29.2	22.1	
Not on ART	59.5	15.2	25.3		55.8	24.7	19.5	
History of Hepatitis C								
No	62.9	12.7	24.5	<0.001	61.0	15.2	23.7	0.002
Yes	42.4	11.9	45.7		42.2	22.3	35.5	
Health-Related Quality of Life (HRQL)								
Normal	78.3	11.5	10.2	<0.001	72.1	11.7	16.2	0.002
Impaired mental HRQL	73.9	11.6	14.6		65.3	16.8	18.0	
Impaired physical HRQL	63.0	10.0	27.0		63.3	12.8	23.9	
Impaired physical and mental HRQL	43.9	15.3	40.9		52.9	18.0	29.1	

<sup>a</sup> Weighted percentages

<sup>b</sup> Chi-square test

**Table 3. Prevalence rate ratio of inactivity in 2011 versus 2003, adjusted for individual socio-demographic determinants of position on the labor market (Model 1) and additionally for health status characteristics (Model 2)**

	Model 1		Model 2	
	aPRR	[95% CI]	aPRR	[95% CI]
<i>Survey year</i>				
2003	1		1	
2011	0.83*	[0.72; 0.96]	0.89	[0.77;1.03]
<i>Socio-demographic determinants of position on the labor market</i>				
Sex				
Men	1		1	
Women	1.53*	[1.30; 1.80]	1.54*	[1.32;1.80]
Age (years)				
25-39	0.92	[0.77; 1.11]	0.97	[0.80;1.17]
40-49	1		1	
50-64	2.13*	[1.79; 2.54]	2.21*	[1.87;2.63]
Country of citizenship				
France	1		1	
Sub-Saharan Africa	0.89	[0.74; 1.08]	0.74*	[0.61;0.89]
Other	1.35*	[1.09; 1.67]	1.18	[0.95;1.46]
Educational level				
High	1		1	
Low	1.74*	[1.41; 2.14]	1.66*	[1.35;2.04]
Household composition				
Single, no children	1.15	[0.96; 1.37]	1.14	[0.95;1.36]
Single with children	1.07	[0.82; 1.39]	1.01	[0.78;1.31]
Cohabiting partner, no children	1		1	
Cohabiting partner and children	0.93	[0.72; 1.19]	0.90	[0.70;1.16]
Other cohabiting adults	1.13	[0.87; 1.46]	1.10	[0.86;1.42]
History of intravenous drug use				
No	1		1	
Yes	2.01*	[1.65; 2.45]	1.70*	[1.34;2.17]
<i>Health status</i>				
Duration since HIV diagnosis				
Less than 3 years			1.01	[0.85;1.20]
3 years or more			1	
Immune status at HIV diagnosis				
<200 CD4/mm <sup>3</sup> or AIDS			1.58*	[1.25;1.99]
200-349 CD4/mm <sup>3</sup>			1.11	[0.84;1.47]
350-499 CD4/mm <sup>3</sup>			1.07	[0.83;1.38]
≥500 CD4/mm <sup>3</sup>			1	
Missing			1.33*	[1.03;1.72]
ART status and HIV viral load (VL)				
On ART, VL <400 copies/ml			1	
On ART, VL ≥400 copies/ml			1.09	[0.86;1.38]
Not on ART			1.23	[0.96;1.58]
Missing			1.86*	[1.27;2.72]
History of Hepatitis C				
No			1	
Yes			1.01	[0.80;1.29]
Health-Related Quality of Life (HRQL)				
Normal			1	
Impaired mental HRQL			1.27	[0.87;1.87]
Impaired physical HRQL			1.72*	[1.30;2.28]
Impaired physical and mental HRQL			2.35*	[1.82;3.03]
Missing			2.10*	[1.65;2.67]

aPRR: adjusted prevalence rate ratio

CI: confidence interval

\*p<0.05



**Table 4. Prevalence rate ratio of unemployment in 2011 versus 2003, adjusted for individual socio-demographic determinants of position on the labor market (Model 1) and additionally for health status characteristics (Model 2)**

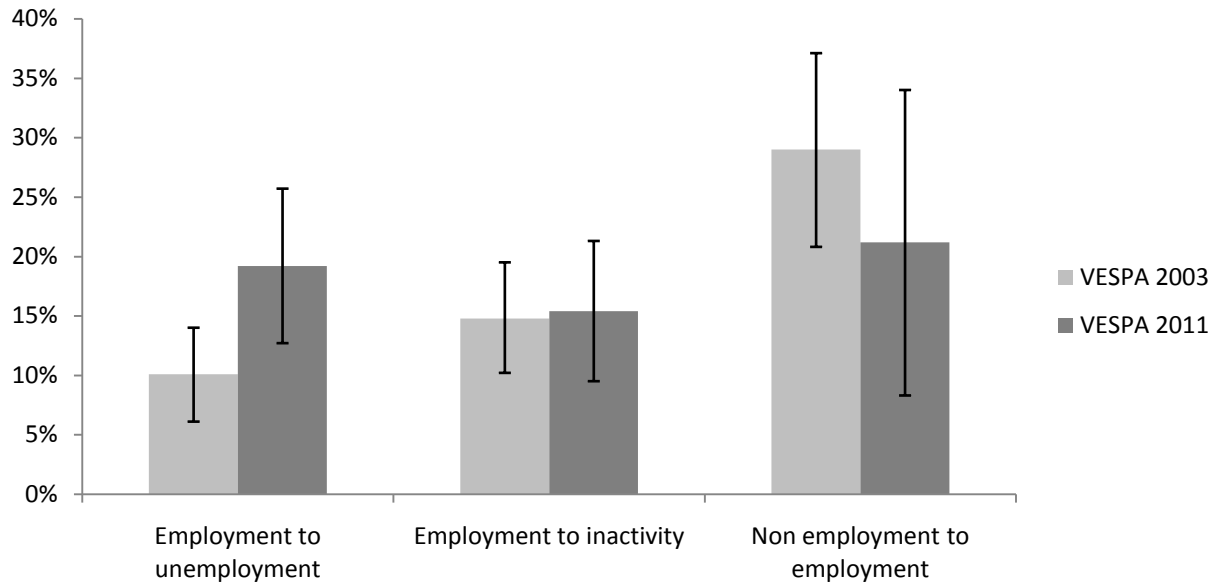
	Model 1		Model 2	
	aPRR	[95% CI]	aPRR	[95% CI]
<u>Survey year</u>				
2003	1		1	
2011	1.28*	[1.04; 1.57]	1.55*	[1.24;1.93]
<u>Socio-demographic determinants of position on the labor market</u>				
Sex				
Men	1		1	
Women	0.93	[0.71; 1.21]	0.93	[0.72;1.21]
Age (years)				
25-39	1.21	[0.96; 1.53]	1.15	[0.91;1.44]
40-49	1		1	
50-64	0.58*	[0.42; 0.82]	0.59*	[0.42;0.83]
Country of citizenship				
France	1		1	
Sub-Saharan Africa	2.11*	[1.62; 2.74]	2.16*	[1.65;2.81]
Other	1.52*	[1.06; 2.17]	1.52*	[1.06;2.18]
Educational level				
High	1		1	
Low	0.96	[0.74; 1.23]	1.00	[0.77;1.28]
Household composition				
Single, no children	1.30	[0.92; 1.84]	1.27	[0.90;1.79]
Single with children	2.11*	[1.43; 3.13]	2.03*	[1.38;2.99]
Cohabiting partner, no children	1		1	
Cohabiting partner and children	1.38	[0.94; 2.04]	1.38	[0.95;2.02]
Other cohabiting adults	1.86*	[1.28; 2.71]	1.69*	[1.15;2.49]
History of intravenous drug use				
No	1		1	
Yes	1.35	[0.92; 1.99]	1.02	[0.64;1.65]
<u>Health status</u>				
Duration since HIV diagnosis				
Less than 3 years			1.46*	[1.15; 1.85]
3 years or more			1	
Immune status at HIV diagnosis				
<200 CD4/mm <sup>3</sup> or AIDS			1.00	[0.73;1.38]
200-349 CD4/mm <sup>3</sup>			1.16	[0.83;1.63]
350-499 CD4/mm <sup>3</sup>			0.75	[0.53;1.07]
≥500 CD4/mm <sup>3</sup>			1	
Missing			1.19	[0.82;1.72]
ART status and HIV viral load (VL)				
On ART, VL <400 copies/ml			1	
On ART, VL ≥400 copies/ml			1.52*	[1.11;2.07]
Not on ART			1.32	[0.98;1.78]
Missing			0.73	[0.38;1.40]
History of Hepatitis C				
No			1	
Yes			1.54	[1.00;2.37]
Health-Related Quality of Life (HRQL)				
Normal			1	
Impaired mental HRQL			1.15	[0.77;1.72]
Impaired physical HRQL			0.74	[0.50;1.08]
Impaired physical and mental HRQL			1.07	[0.76;1.52]
Missing			0.86	[0.61;1.22]

aPRR: adjusted prevalence rate ratio

CI: confidence interval

\*p&lt;0.05

**Figure 1. Labor market transitions following HIV diagnosis among participants of the VESPA-2003 and VESPA-2011 surveys diagnosed HIV-infected within the 36 months preceding interview**



**Supplementary material****Table S1. Socio-demographic determinants of position on the labor market and health status characteristics of participants of the VESPA-2003 and VESPA-2011 surveys diagnosed HIV-infected within the 36 months preceding interview**

	VESPA-2003 <sup>a</sup> (N=427)	VESPA-2011 <sup>a</sup> (N=366)	P-value <sup>b</sup>
<i>Socio-demographic determinants of position on the labor market</i>			
Sex			
Men	62.8	63.9	0.79
Women	37.2	36.1	
Age (years)			
25-39	56.8	54.6	0.84
40-49	26.2	28.0	
50-64	17.0	17.4	
Country of citizenship			
France	56.6	58.0	0.14
Sub-Saharan Africa	34.1	37.2	
Other	9.3	4.8	
Educational level			
High	29.0	33.5	0.31
Low	71.0	66.5	
Household composition			
Single, no children	37.5	35.4	0.61
Single with children	10.2	14.6	
Cohabiting partner, no children	22.5	21.8	
Cohabiting partner and children	14.3	12.3	
Other cohabiting adults	15.5	15.9	
History of intravenous drug use			
No	97.7	98.2	0.66
Yes	2.3	1.8	
<i>Health status</i>			
Immune status at HIV diagnosis			
<200 CD4/mm <sup>3</sup> or AIDS	37.6	29.1	0.03
200-349 CD4/mm <sup>3</sup>	20.7	19.2	
350-499 CD4/mm <sup>3</sup>	13.7	24.6	
≥500 CD4/mm <sup>3</sup>	24.1	23.6	
Missing	3.9	3.5	
ART status and HIV viral load (VL)			
On ART, VL <400 copies/ml	57.1	69.7	0.01
On ART, VL ≥400 copies/ml	10.2	4.4	
Not on ART	31.1	23.0	
Missing	1.6	2.9	
History of Hepatitis C			
No	94.0	97.0	0.05
Yes	6.0	3.0	
Health-Related Quality of Life (HRQL)			
Normal	21.4	19.5	0.001
Impaired mental HRQL	12.6	8.0	
Impaired physical HRQL	13.3	20.9	
Impaired physical and mental HRQL	14.5	24.6	
Missing	38.2	27.0	

<sup>a</sup> Weighted percentages<sup>b</sup> Chi-square test

## **Appendix**

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