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ABSTRACT:

Border areas are particular “hot spots” generating high levels of HIV vulnerability and facing great challenges to control epidemics. The objective of this study is to describe the sociodemographic, clinical and biological profiles of newly HIV diagnosed people at the French Guiana-Suriname border, to construct an HIV care cascade **and compare it with the Surinamese one**. HIV-patients aged over 15 years newly diagnosed in western French Guiana in 2011 and 2012 were included in a retrospective cohort study. Patients were identified using different sources (n=121). The male-to-female ratio was 0.8, 85% of the patients were of foreign origin, 72% were undocumented migrants, 21% were living in Suriname and 48% had baseline CD4 cell counts <200 cells/mm3. After one year, 34% were lost to follow-up, 54% received treatment, 34% had controlled viremia and 6% died. We observed a disappointing HIV cascade, **like that of Suriname**, requiring to develop a coordinated healthcare offer on both sides of the border. Targeted efforts through a bi-national collaboration are needed to address the specific issues of cross-border patients to **reach the 90*3 UNAIDS’s diagnosis, link to care and treatment targets and better control the local epidemic.**

KEY WORDS:

HIV, French Guiana, Suriname, Migrant, Health Policy

INTRODUCTION:

There is growing evidence linking HIV prevalence and population mobility (International Organization for Migration [IOM], 2009). Mobile populations, and even more so undocumented migrants, constitute vulnerable populations at higher risk of HIV acquisition and lower access to care and support (Tanser, Bärnighausen, Vandormael, & Dobra, 2015). In addition, some people living with HIV (PLHIV) may migrate to avoid stigmatization or to access comprehensive HIV care. Border areas are particular "hot spots" generating HIV vulnerability and facing great challenges to control epidemics (Espinoza, Hall, & Hu, 2009; Hemhongsa et al., 2008; Lyttleton & Amarapibal, 2002; Servin, Muñoz, & Zúñiga, 2014). Transborder discrepancies in access to care and social services and lack of collaboration on health issues may further increase these challenges (Coker, Atun, & McKee, 2004).

French Guiana (Guiana) is a French overseas territory. Saint Laurent du Maroni (SLM) lies along the Maroni River marking the French-Suriname border. There have been dramatic population changes since the early 90's, when civil war in Suriname forced a massive flux of refugees into western Guiana. In 2013, the city counted 41,800 inhabitants, but its hospital serves an estimated 80,000 persons. It has a rapidly growing (+7%/year), multicultural, multi-lingual, highly mobile population. Compared to the rest of the costal Guiana, the economy and the health care offer are less developed (Carde, 2009).

For 20 years, Guiana has had the highest HIV prevalence in France (Nacher et al., 2010). In 2014, 560 HIV patients were followed at SLM's hospital, representing 30% of all HIV patients followed in Guiana. **The features of the HIV epidemic in western Guiana are unique. Concurrent partnerships may be one of the main drivers of the epidemic** (Nacher et al., 2010)**, while stigma remains very high** (van Melle et al., 2015)**. Mobile populations, notably boatmen** (Gaubert-Marechal et al., 2012)**, had an important role in the rapid increase of HIV prevalence since the 90's acting as a bridging**

group between vulnerable sex workers and the general population. However, mobility along and across the Maroni has many motives: economic (gold mining, and informal transborder's economy), farming and "family-related".

Guiana and Suriname are compared in Table 1. In eastern Suriname, clinics only provide primary care and only few HIV patients are followed (around 20 patients in 2014). Antiretroviral drugs (ARV) are available, but those requiring CD4-count, viral load, or radiology need to travel about 150 Km to Paramaribo on their own expenses. There, public hospitals provide non-emergency care free of charge (FOC) for persons of Surinamese citizenship only.

The objective of the study was to describe the characteristics of newly diagnosed HIV-patients in western Guiana, to construct the HIV care cascade **and compare it with the Surinamese one**.

METHODS:

Between January 1st 2011 and December 31st 2012, all patients aged over 15 years, newly-diagnosed with HIV-infection in Western Guiana were included in a retrospective cohort analysis. Patients were identified from the French Hospital Database on HIV, from SLM's Hospital laboratory, or from other health providers involved in HIV-screening in western Guiana. Sociodemographic data (age, gender, country of birth, residency status, place of residence), characteristics of HIV screening (place and testing mode, baseline CD4 count), treatment outcome at one year were collected from medical records. Patients were considered "lost-to-follow up" if they had not consulted for >6 months.

The HIV-care cascade, was a denominator-denominator linked cascade which used the exact same group of individuals for all stages of the cascade (Haber, Pillay, Porter, & Bärnighausen, 2016). We constructed 4 stages, **using the same definitions as the Surinamese cascade** (MoH Suriname, 2015) : "HIV diagnosed", "Linked to HIV-Care" **(at least one CD4 count),** "on ART" (initiation of ART) and

"suppressed viral load" **(at least one estimation of viral load ≤ 1000 copies/ml after 6 to 12 months of treatment**).

This protocol was approved by the institutional review board of the SLM Hospital.

Statistical analysis was carried out with Epi Info 7 software.

RESULTS:

The study included 121 patients. Sociodemographic, screening and baseline data are described in table 1. Most new HIV patients were females (56%), born in Suriname (60%) and undocumented (72%). Most patients (56%) lived in SLM and 21% in Suriname (Paramaribo 12%, Albina: 5%, other: 4%). 48% had baseline CD4 cell counts <200/mm^3.

A small proportion of cases (9%) had previously been diagnosed; mostly (9/11) in Suriname. At one year, 34% were lost to follow-up, 6% were referred to another clinic and 6% had died.

Figure 1 represents the HIV care cascades in western Guiana **and Suriname between 2007 and 2012**. Among the 121 HIV-diagnosed patients, 89% were linked to HIV care. Treatment was indicated for 74% of the patients and initiated in 73% of them. **Forty-one patients (34%) had viral load <1000 copies/ml after 6 months. Other patients were either non-adherent to therapy (21%) or were not tested for viral load (79%). Using a threshold at 50 copies/ml, we found a 29% suppression rate. The migratory status did not influence the cascade.** Forty-seven treated patients were tested for HIV drug-resistance and 9 (19%) presented resistances to ARVs: 6 (12.8%) to at least one NNRTI, 4 (8.5%) to NRTI, 1 (2.1%) to PI and 2 (4.2%) to NtRTI. Three out of eight (38%) known HIV-infected patients showed HIV drug-resistance.

DISCUSSION:

Most of newly diagnosed HIV-infected patients were women, contrarily to mainland France (2.1) (Morlat, 2013) and to other parts of Guiana (1) (Melin, 2014). However, this is similar to the

Caribbean Region (UNAIDS, 2012), where HIV/AIDS disproportionately affects women and adolescent girls.

Most of patients were of foreign origin (85%) with a precarious legal status (72% were undocumented migrants), whereas among the general adult population living in SLM these proportions are estimated at 58% and 26%, respectively (Jolivet et al., 2012). Migrants and undocumented migrants are therefore overrepresented among PLHIV.

Almost half (48%) of patients had low baseline CD4 cell counts, whereas this proportion was 29% for patients followed in Cayenne Hospital (Regional Coordination Center for the Fight against HIV [COREVIH - French Guiana], 2015). The death rate at one year (6%) was much higher compared to the whole Guiana HIV cohort where it dropped below 1% per year since 2005 (COREVIH, 2015).

Twenty-one per cent of the patients in care at SLM were currently living in Suriname. HIV-infection was already diagnosed in Suriname for 7% of the cohort. Some of them may have received treatment in Suriname. The proximity and the perception of having better healthcare facilities in SLM was one of the main reasons for patients living in Suriname to seek pregnancy and emergency care in SLM's hospital (Jolivet, Florence, Lebas, & Chauvin, 2010)**. The high level of stigmatisation in that area** (van Melle et al., 2015) **is probably an additional factor to seek HIV care elsewhere. U**nfortunately, we did not have information on patient itineraries. Further research should aim to better understand Surinamese patients' health seeking itineraries. Migration of PLHIV across the border has considerable implications in relation to health service provision **and public health surveillance systems. Therefore, in Suriname as well as in Western Guiana, the estimation of HIV-prevalence as well as the whole HIV care cascade may be affected.**

We observed a disappointing HIV care cascade where only 34% of the cohort had controlled viremia **mainly due to the high rate of lost to follow-up.** In c**omparison with the Surinamese HIV cascade (MoH Suriname, 2015), more patients were linked to care and on ART in Guiana (where treatment initiation threshold is higher), but we found a similar rate of patients lost to follow-up after treatment initiation. Some patients lost to follow-up in Suriname could presumably be found in**

SLM and vice-versa. Factors associated with follow-up interruption could not be identified in this small study. Other local studies (Nacher et al., 2006) showed that younger patients, foreigners and undocumented patients were more likely to be lost to follow-up, as well as those not receiving any treatment or with CD4< 500 mm/3 when diagnosed. Precarious living conditions of migrants, presumably explain adherence difficulties. In Guiana, the full healthcare package including ARV according to French national guidelines is accessible FOC to all patients, including undocumented migrants, under the precept of emergency care. However, provision of chronic care is hampered by administrative hurdles **and discriminations** in accessing health services (Carde, 2007) leading to frequent disruptions in health insurance and follow-up. Linguistic barriers, illiteracy, lack of information and support in mother tongue may also explain these results.

Finally, as a probable consequence of cross-border patient mobility and low adherence, we observed a high prevalence of drug resistance among our cohort: 19% compared to 12.2% in France among newly diagnosed HIV patients (Morlat, 2013), 6.3% in Latin America and the Caribbean Region (Frentz, Boucher, & Van De Vijver, 2012), and 4.6% in the whole Guiana (among treatment-naive patients with a CD4 cell count above 350/mm3) (Darcissac et al., 2016). This makes research and co-ordinated strategies urgent in this area.

The main limitations of the study were the small study population, the retrospective design and the frequent missing data. Moreover, our cascade, was based on a limited number of patients during a limited period and did not include undiagnosed HIV. With an estimation of 40% of undiagnosed HIV (MoH Suriname, 2015)**, our rate of suppressed viral load would drop to 20%. Finally, the comparison with Surinamese's cascade is also limited because of different time-frames and different methods in data surveillance and data analysis.**

CONCLUSION:

Our study shows that PLHIV living on the French-Suriname border are vulnerable and deserve specific attention. This requires bi-national collaboration to address the specific issues of cross-border patients. Both countries should first reinforce the care offer and facilitate its access. Both systems must work together to systematize exchanges of medical information to support continuity of care for mobile patients. Joint research efforts should aim to better estimate and understand the high level of follow-up interruption in both countries. Much remains to be done in the general population, to provide information on HIV transmission, improve testing and reduce stigma and discrimination. A strong support from national and regional health authorities is essential in both countries to reach these goals.

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Figure 1: The HIV care cascade in Western French Guiana (2011-2012) and Suriname (2007-2012)

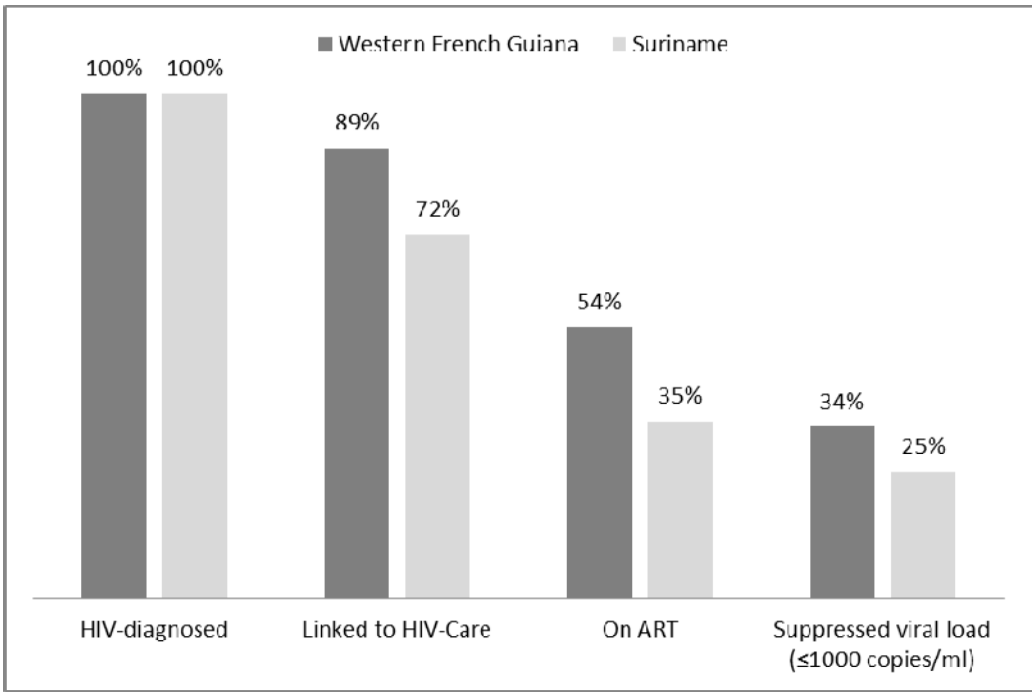

Table 1 : General and HIV data in French Guiana and Suriname

	French Guiana	Suriname
Density (km^2)	83 530	163 820
Population (2014)	250 380	568 000
Human Development Index (2010)	0,739*	0,707**
HIV prevalence among pregnant women	1.14% (2014)***	0.9% (2010)‡
Number of new HIV diagnoses (up to 2013)	2549‡‡	7090‡
Number of new HIV diagnoses in 2013	148‡‡	473‡
Number of HIV patients on ART (2013)	1461‡‡	1343‡

* (Sudrie, 2013)

** UNDP (Suriname)

*** French Guiana regional register of births (2014)

‡ (MoH Suriname, 2015)

‡‡ Regional Coordination Center for the Fight against HIV (COREVIH) French Guiana

Table 2: Patients characteristics

		N	%
Gender	Male	53	43.8
	Female	68	56.2
Age (at diagnosis) (Mean ± SD)	Among male	39.9 ± 10.4	
	Among female	34.8 ± 12.1	
Country of birth	French Guiana	18	14.9
	Suriname	73	60.3
	Brazil	11	9.1
	Guyana	10	8.3
	Haiti	8	6.6
	Dominican Republic	1	0.8
Residency status	French citizens	18	17.8
	Regular migrant	10	9.9
	Irregular migrant	73	72.3
	Missing data	20	-
Place of residence	St-Laurent du Maroni	66	55.5
	Other city/village in French Guiana	29	24.2
	City/village in Suriname	25	20.8
	Missing data	1	-
Place of screening	St-Laurent Hospital	68	56.1
	Family doctors	21	17.4
	Red-Cross	14	11.6
	AIDES	9	7.4
	Clinics	6	5.0
	Other	3	2.5
Mode of screening	Blood test	105	86.8
	Rapid HIV Test	16	13.2
Motives for screening	Opportunistic testing	33	32.0
	Clinical symptom*	48	46.6
	Pregnancy	11	10.7
	Partner HIV+	7	6.8
	HIV already known	4	3.9
	Missing data	18	-
Previous diagnosis	Yes	11	9.1
	No	110	90.9
CD4 count at screening	CD4<200	47	47.5
	200≤CD4<500	29	29.3
	500≤CD4	23	23.2
	Missing data	22	-
Co-infection Rates	HIV/HBV	6	5.0
	HIV/HCV	0	0
	HIV/HTLV	7	5.8
Outcome at one year	Follow-up	65	53.7
	Lost to follow-up	41	33.9
	Addressed to other specialized care	8	6.6
	Died	7	5.8
	Total	121	100.0

* including : Deterioration of general status (weight loss, asthenia, anorexia) (24), isolated fever (4) , diarrhea (4), primo-infection (2), Opportunistic infection (zona (3), histoplasmosis (2), TB (2), candidosis (1)), neurologic symptom (2), dermatosis (1), other STD (2), other (1).