

Non-AIDS bacterial infections are the main cause of hospital admissions in HIV-infected patients in 2010-2017: data from the San Paolo Infectious Diseases (SPID) cohort.

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Background

Previous studies have reported a reduction by 20-40% in hospitalization rates among people living with HIV after cART introduction. Along with a significant reduction in hospitalization rates in the last years, a clear shift in the causes for hospitalization was observed: **hospitalizations for AIDS-defining illnesses declined in the most recent years** and were observed in patients with low CD4+ T cells count at HIV diagnosis, while **hospitalizations for non-AIDS defining illnesses doubled**, with severe bacterial infections accounting for more than 25% of hospitalizations [1-3].

We aimed to evaluate the prevalence of hospital admissions in HIV-positive patients compared to HIV-negative subjects over 2010-2017 at the Clinic of Infectious Diseases, S.Paolo Hospital, Milan, Italy (SPID cohort); we also investigated the clinical and viro-immunological correlates of hospital admissions for non-AIDS bacterial infections (INF) in HIV-positive patients over 2010-2017 at the SPID cohort.

Methods

Retrospective, cross-sectional study including hospital admissions for any reason among HIV-positive and HIV-negative patients at our centre (01/01/2010-12/31/2017).

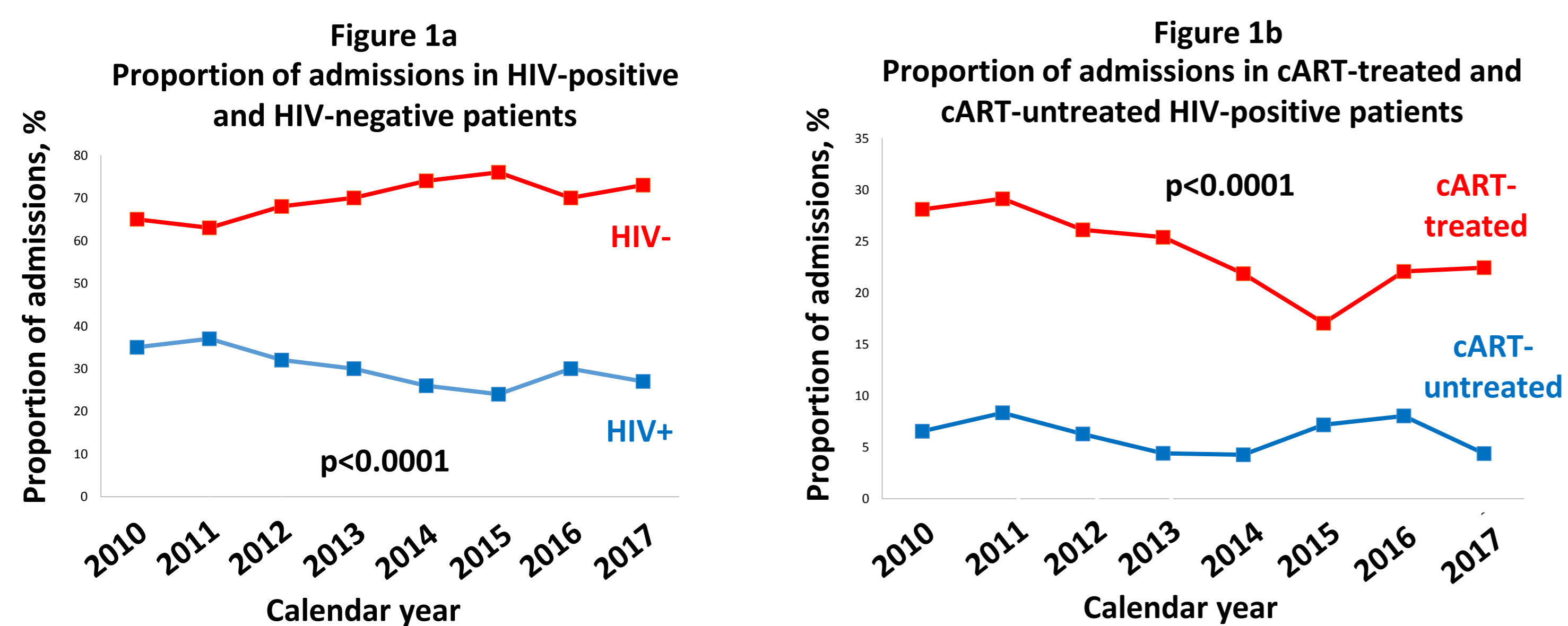
The main cause of hospitalization in HIV-positive patients was grouped in 5 categories: non-AIDS defining bacterial infections (INF); AIDS-defining illnesses (ADI); liver/gastrointestinal diseases (GI); non-AIDS cancers; other (cardiovascular-renal-genitourinary-pulmonary-psychiatric-other).

Each hospitalization was placed into a single mutually exclusive category.

Yearly prevalence of hospital admission in HIV-positive and HIV-negative patients was calculated. Chi-square and Mann-Whitney/Kruskal-Wallis tests were used for statistics.

Results

3488 hospitalizations were recorded at our centre over 2010-2017: 1056 (30%) hospital admissions were in HIV-positive patients. There was a reduced proportion of hospitalization in HIV-positive vs HIV-negative patients in recent years (from 148/427, 35% in 2010 to 110/410, 27% in 2017 in HIV-positive patients; from 279/427, 65% in 2010 to 300/410, 73% in HIV-negative patients; $p < 0,0001$). (Figure 1a).



The hospital admissions in HIV-positive patients were: 191, 18% in patients at first HIV diagnosis, 786, 74% in cART-treated patients (for 79, 7% patients therapeutic history was unknown) (Figure 2).

Among HIV-positive patients, we observed a reduction of hospitalizations in cART-treated patients (from 120/427, 29% in 2010 to 92/410, 22% in 2017), compared to antiretroviral-naïve patients (from 28/427, 6% in 2010 to 18/410, 5% in 2017; $p < 0,0001$) (Figure 1b).

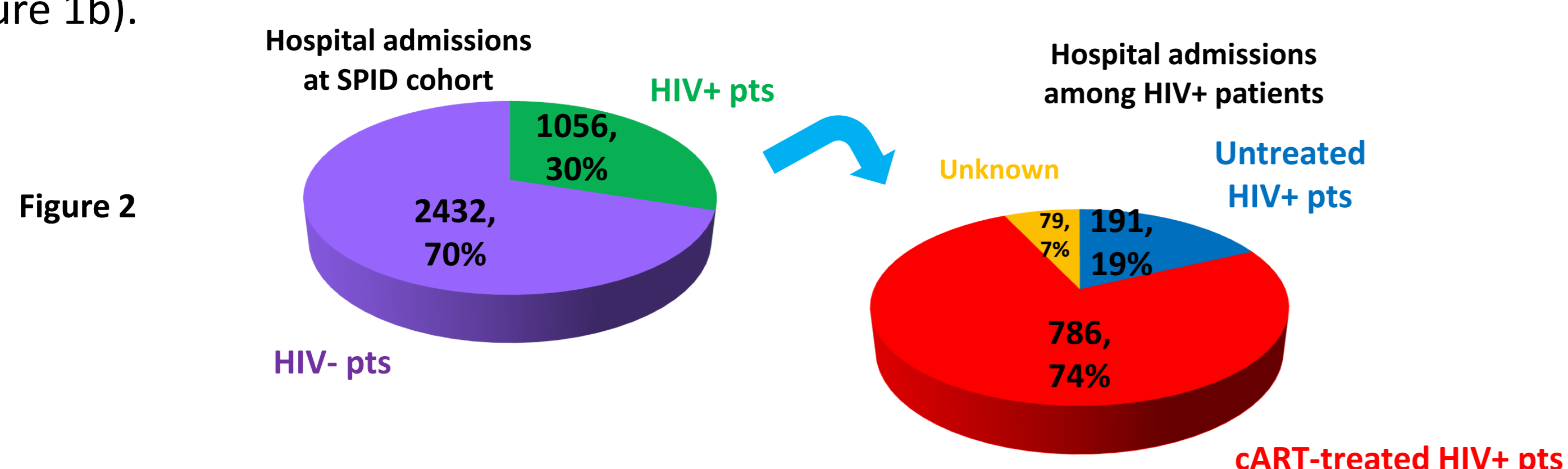


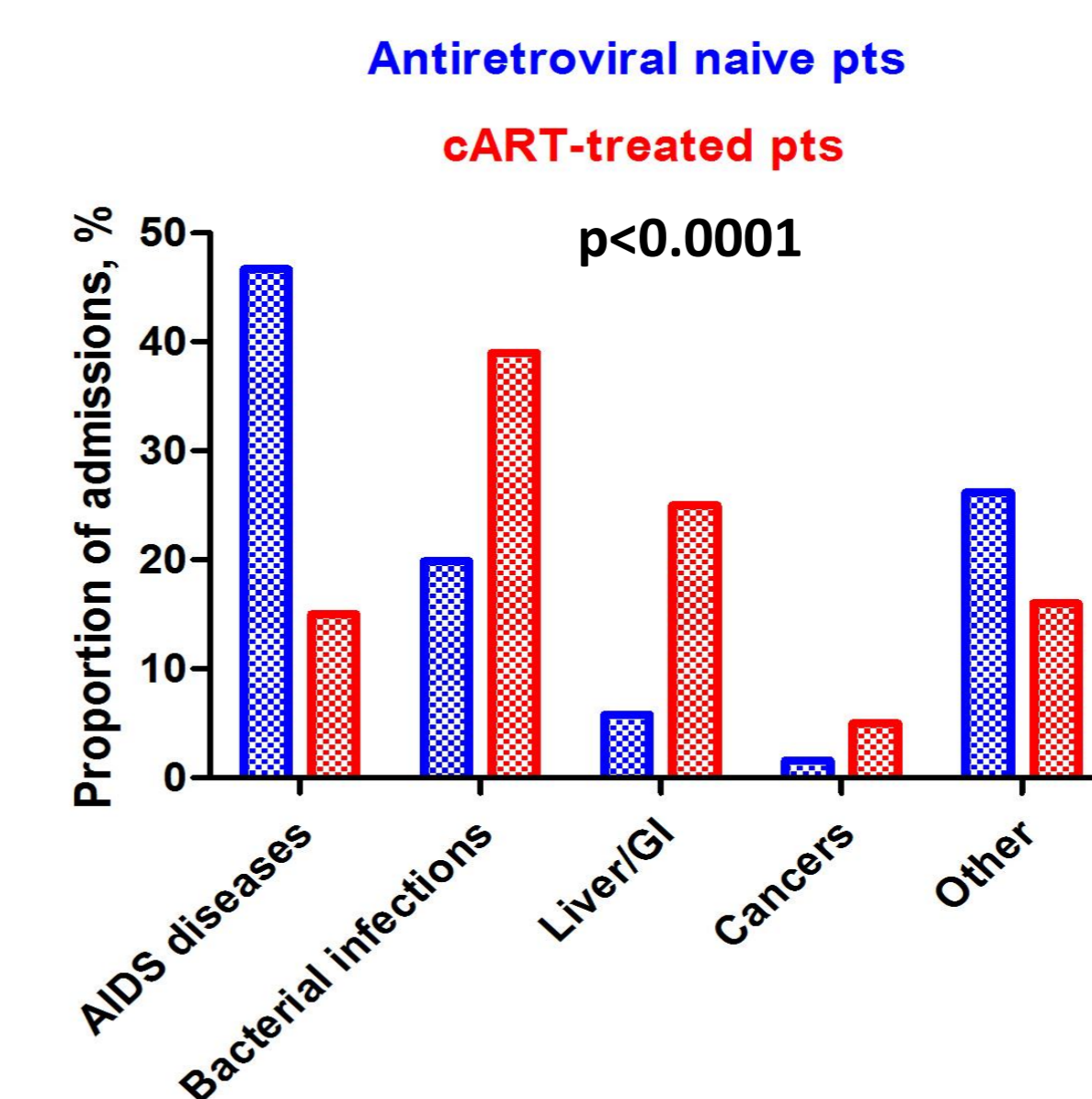
Table 1: Baseline characteristics of 1056 hospital admissions in HIV-positive patients

1056 Hospital admissions in HIV-positive patients	
Age, median (IQR)	49 (42-54)
Males, n (%)	798 (75%)
Length of hospitalization, days, median (IQR)	9 (6-15)
Calendar period, n (%)	
2010-2013	597 (56%)
2014-2017	459 (43%)
cART-treated patients, n (%)	786 (74%)
cART regimen, n (%)	
INSTI	108 (14%)
PI	367 (47%)
NNRTI	129 (16%)
Other/Unknown	182 (23%)
CD4+ T cells nadir, cells/mm ³ , median (IQR)	101 (45-202)
CD4+ T cells, cells/mm ³ , median (IQR)	261 (102-492)
HIV-RNA, log ₁₀ copies/mL, median (IQR)	1,59 (1,59-3,92)
Patients on cART with undetectable HIV-RNA, n (%)	335 (34%)

References: 1. R., et al, *Clin. Infect. Dis.* (2017); 65(3):469-476; 2. Collin, A. et al. *PLoS ONE* (2016); 11(4):e0152970.; 3. Ford N et al, *Lancet HIV.* (2015); 2(10):e438-44.

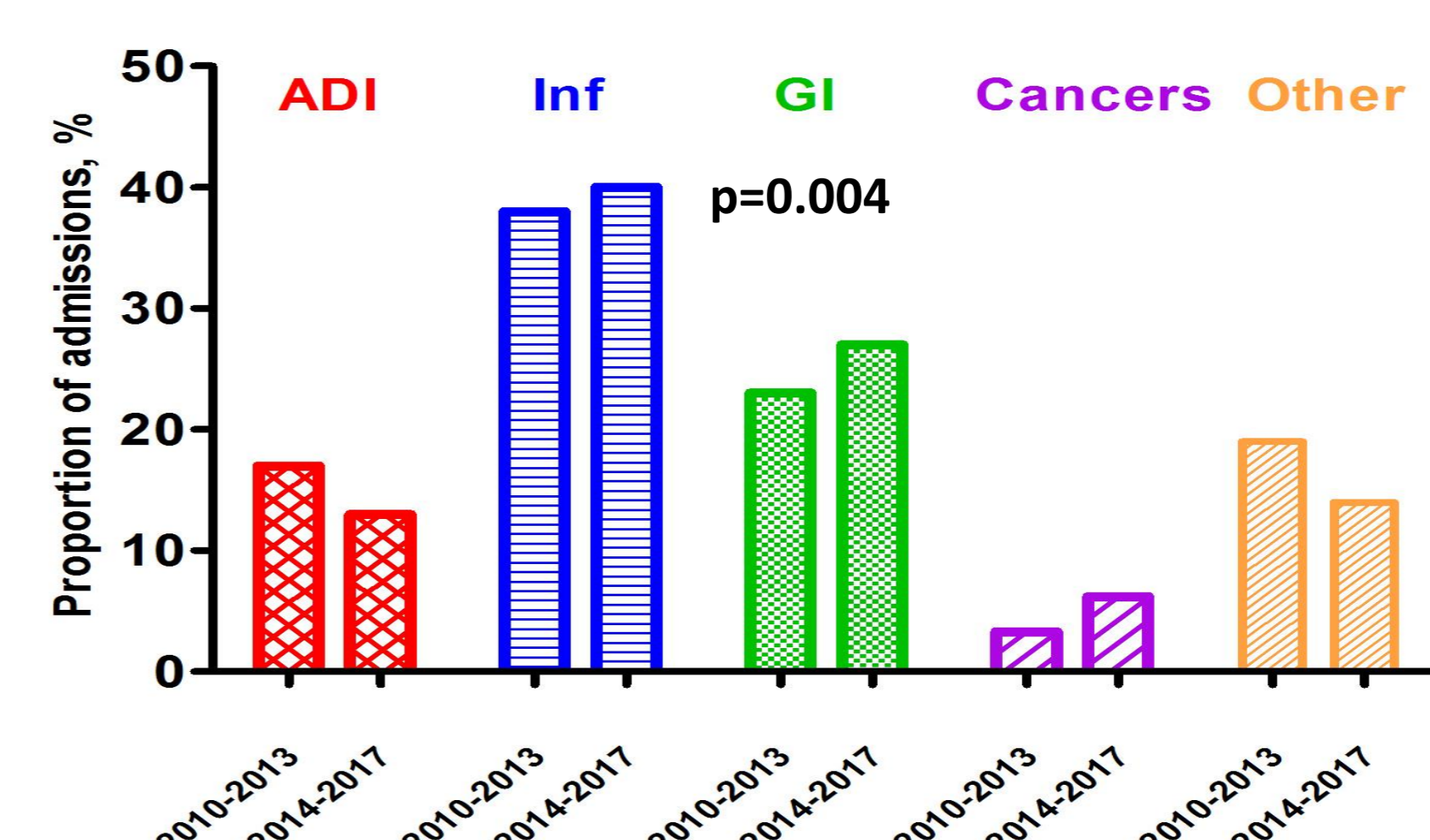
Among HIV-positive patients, 384 (36%) hospitalizations were for bacterial infections, 223 (21%) for AIDS-defining illnesses, 219 (21%) for gastrointestinal and liver diseases, 39 (4%) for non-AIDS cancers and 191 (18%) for other. The most frequent causes of admission were bacterial infections (304/786, 39%), followed by gastrointestinal/liver diseases (196/786, 25%) among cART-treated patients and AIDS-defining diseases among cART-naïve pts (89/191, 47%) ($p < 0,0001$) (Figure 3).

Figure 3 Main causes of hospital admissions among HIV-positive patients



In cART-treated patients, from 2010-2013 to 2014-2017 admissions for bacterial infections remained stable (from 38% to 40%), non AIDS-cancers doubled (from 3,3% to 6,2%) and AIDS-illnesses decreased (from 17% to 13%) ($p = 0,004$) (Figure 4).

Figure 4: Reasons of hospital admissions among cART-treated patients over 2010-2017

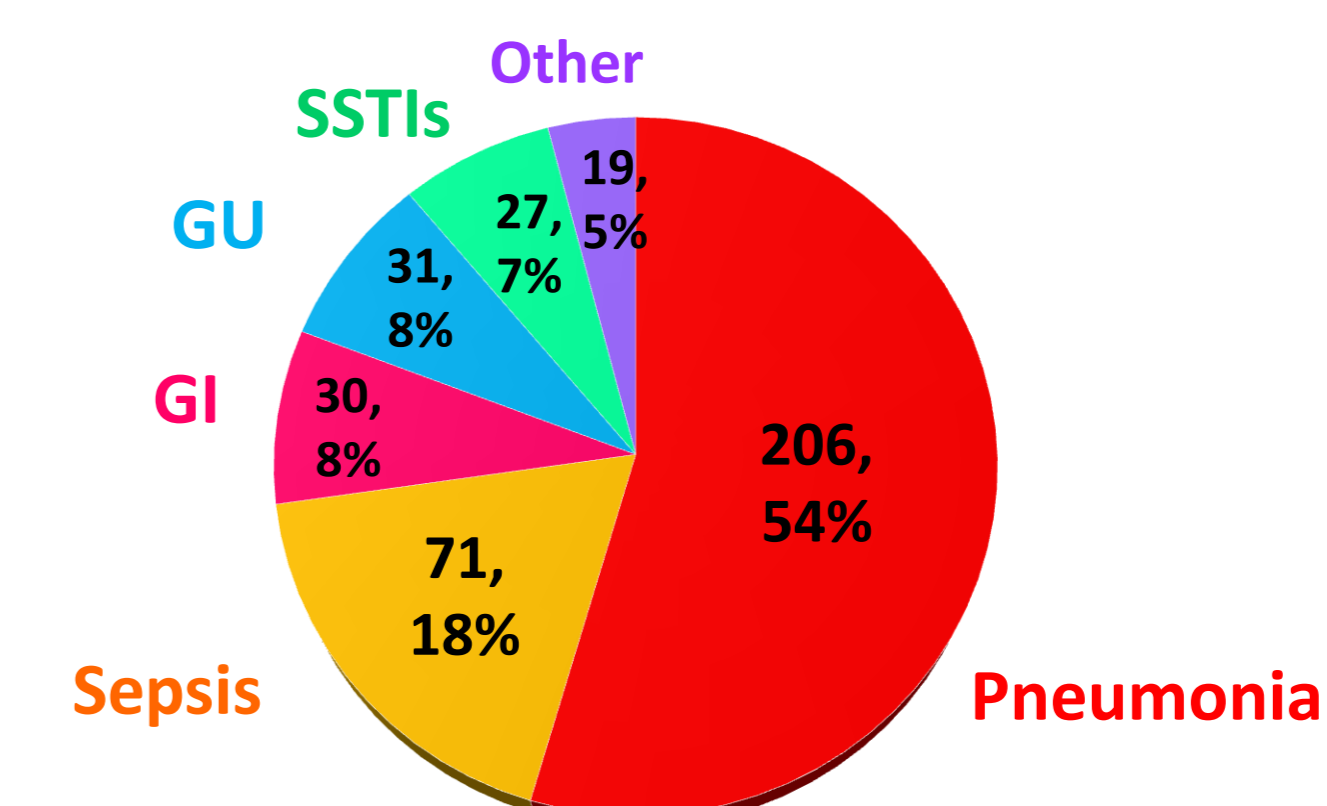


HIV-positive patients admitted for bacterial infections were more commonly older, cART-treated with undetectable HIV-RNA and higher current/nadir CD4+ count and presented shorter length of hospital stay, compared to patients admitted for AIDS diseases (Table 2).

Table 2: Comparison among different reasons of hospital admission

	Non-AIDS bacterial infections (N 384)	AIDS-defining illnesses (N 223)	Other (N 449)	p values
Males, n (%)	285 (74%)	174 (78%)	338 (75%)	0,574
Age, median (IQR)	49 (43-56)	45 (37-52)	49 (43-55)	<0,0001
Length of hospital stay, days, median (IQR)	9 (6-14)	14 (9-23)	7 (5-12)	<0,0001
Antiretroviral-naïve	38 (10%)	89 (40%)	65 (14%)	<0,0001
On cART	304 (79%)	120 (54%)	362 (81%)	
Unknown	42 (11%)	14 (6%)	22 (5%)	
Not Italian, n (%)	64 (17%)	55 (25%)	60 (13%)	0,001
CD4+ T cells nadir, cells/mm ³ , median (IQR)	111 (60-204)	58 (27-115)	133 (63-242)	<0,0001
CD4+ T cells, cells/mm ³ , median (IQR)	322 (188-525)	101 (40-255)	321 (142-519)	<0,0001
HIV-RNA >40 cp/mL, n (%)	75 (30%)	66 (63%)	83 (28%)	<0,0001
cART regimen, n (%)	304	120	362	<0,0001
INSTI-based	29 (9,6%)	34 (28,3%)	55 (15,1%)	
PI-based	152 (50%)	57 (47,6%)	167 (46,1%)	
NNRTI-based	61 (20%)	10 (8,3%)	59 (16,3%)	
Other regimens	62 (20,4%)	19 (15,8%)	81 (22,5%)	

Bacterial infections were represented mainly by pneumonia (206, 54%) and sepsis (71, 18%) (gastro-intestinal: 30, 8%, genito-urinary: 31, 8%, skin-soft tissue infections: 27, 7%; other: 19, 5%).



Conclusions

Most of hospital admissions over 2010-2017 at our centre are among HIV-negative patients. From 2010 to the last years hospitalization among cART-treated HIV-positive patients declined; non AIDS-bacterial infections, and in particular pneumonias, still represent the main cause of hospital admission in virally suppressed cART-treated patients.

With the aging of HIV population, hospitalizations for non-AIDS cancers doubled over 2010-2017.