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COCOVIH study: Over-mortality and impact of comorbidities for people living with HIV (PLHIV)

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Background

- HIV infection is a chronic disease with **efficacious treatments**
- However, some patients are still **not treated**, and treatments induce **complications**
- PLHIV have **comorbidities** due to common risk factors (hepatitis B and C…)
- Few studies have explored the comorbidities / over-mortality due to HIV infection in **representative** / **full country populations**
  - ✓ Focused on registries / cohorts that may be biased
  - ✓ Report crude mortality or in comparison with the global population (Standardised mortality rates)

- Fontela C et all. Trends and causes of mortality in a population-based cohort of HIV-infected adults in Spain: comparison with the general population. Sci Rep. 2020 Jun 2;10(1):8922.
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- Burchell AN, et all. Cause-specific mortality among HIV-infected people in Ontario, 1995-2014: a population-based retrospective cohort study. CMAJ Open. 2019 Jan 8;7(1):E1-E7.
- Nanditha NGA, et all. Excess burden of age-associated comorbidities among people living with HIV in British Columbia, Canada: a population-based cohort study. BMJ Open.
- Prodel M, et all. Costs and mortality associated with HIV: a machine learning analysis of the French national health insurance database. J Public Health Res. 2021.
- Pourcher V, et all. Comorbidities in people living with HIV: An epidemiologic and economic analysis using a claims database in France. PLoS One. 2020.

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COCOVIH Objectives

Our aims were to estimate :

- The over-mortality of PLHIV
- The prevalence of comorbidities as compared to a control group of subjects not suffering from HIV
- The weight of these comorbidities on the over-mortality of PLHIV

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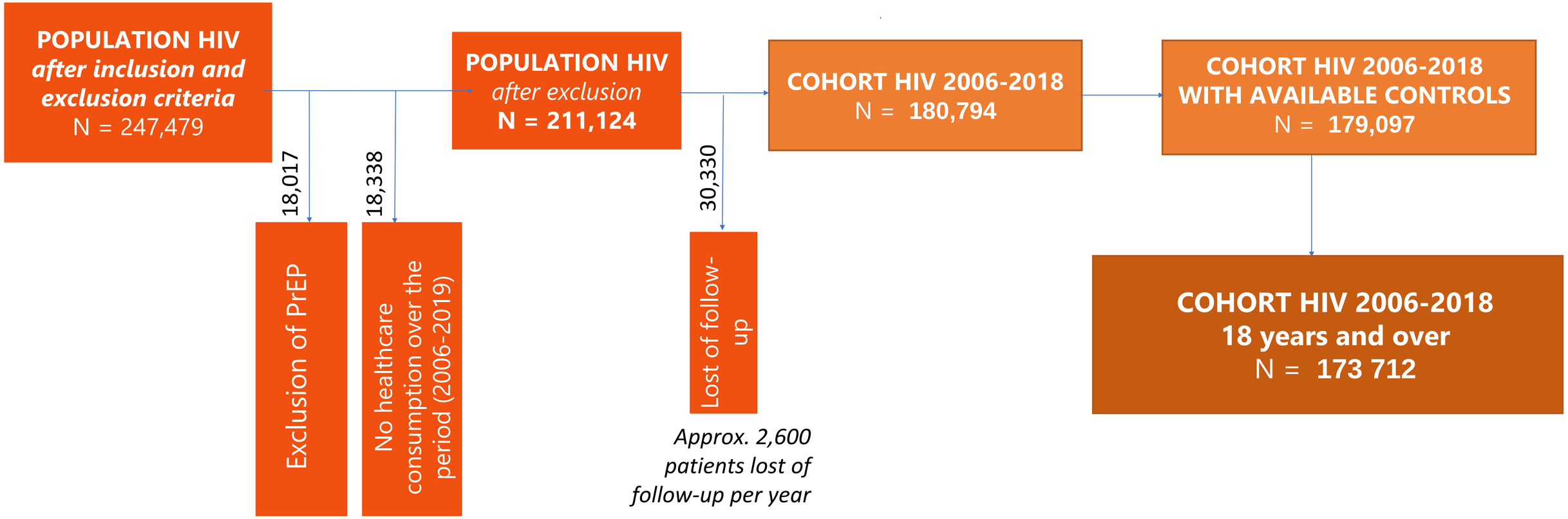
COCOVIH STUDY design

- The French hospital and claim database **SNDS** was used to perform this study
- Adult patients living with HIV (PLHIV) were included between **2006 and 2019** based on
  - ✓ A **long term disease** for HIV
  - ✓ **Hospitals stays** with a ICD10 code for HIV infection
  - ✓ Claims for **drugs specific of the HIV** infection
  - ✓ Claims for **HIV specific laboratory tests**
- Comorbidities were identified with specific **algorithms**

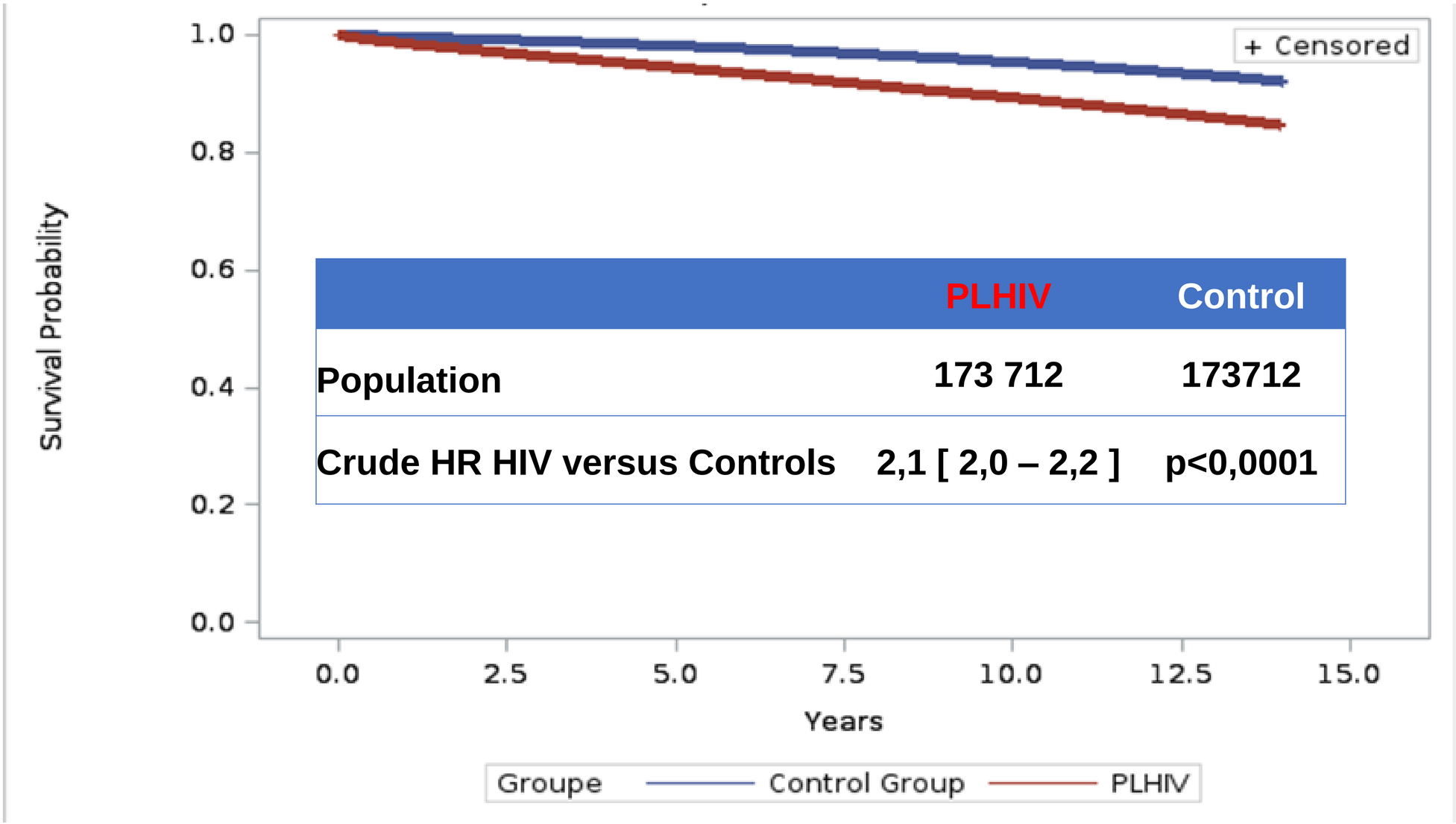
- An age and gender matched control group (French population) with no criteria for HIV infection was also included between 2006 and 2019
- **Each** control was identified on the same date than the PLHIV and followed up from this date
- Cox regression models were used to estimate the increase in mortality among HIV patients compared to the controls
- HR were estimated with adjustments on comorbidities

https://assurance-maladie.ameli.fr/sites/default/files/2022_methode-reperage-pathologies_cartographie_0.pdfs

COCOVIH Flowchart



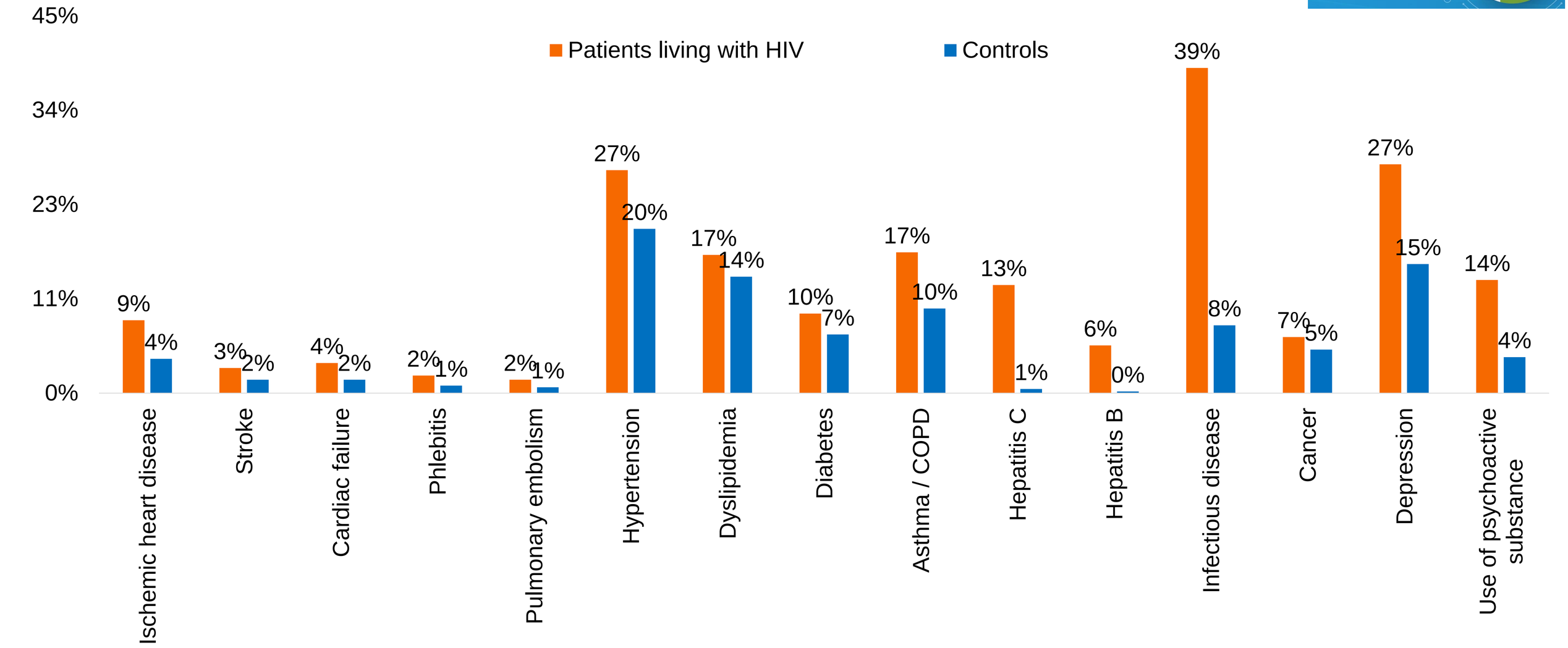
PROBABILITY of SURVIVAL OVERTIME PLHIV versus French population



	PLHIV	Control
Population	173 712	173712
Crude HR HIV versus Controls	2,1 [2,0 – 2,2]	p<0,0001

COMORBIDITIES AND RISK FACTORS

PLHIV VERSUS CONTROLS



All differences are statistically significant (p<0.0001)

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IMPACT OF COMORBIDITIES ON DEATHS

Crude HR=2.13

Adjustment on infectious diseases that occurred between 2006 and 2018 or death

HR=1.59

Adjustment on infectious diseases lead to a decrease of:

$$\frac{2.13-1.59}{2.13-1} = 0.48$$

Adjustment on infectious diseases leads to a 48% decrease of the overmortality of PLHIV

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IMPACT OF COMORBIDITIES ON DEATHS

UNIVARIATE ANALYSIS	HR PLHIV / controls	CI95%		HR decrease
Without adjustment	2.13	2.072	2.199	
Adjustment on:				
• Infectious deseases	1.59	1.538	1.638	48%
• Hepatitis C	1.79	1.736	1.847	30%
• Psychiatric disorders	1.95	1.893	2.009	16%
• Ischemic cardiopathy	2.08	2.025	2.149	4%
• Hepatitis B	2.06	2.002	2.126	6%
• Thrombo-embolic events	2.09	2.028	2.152	4%
• Peripheral artery disease	2.10	2.043	2.168	3%
• Cancer	2.11	2.045	2.17	3%
• Obstetric diseases	2.11	2.047	2.172	2%
• Stroke	2.12	2.059	2.185	1%
• Kidney diseases	2.13	2.072	2.199	0%

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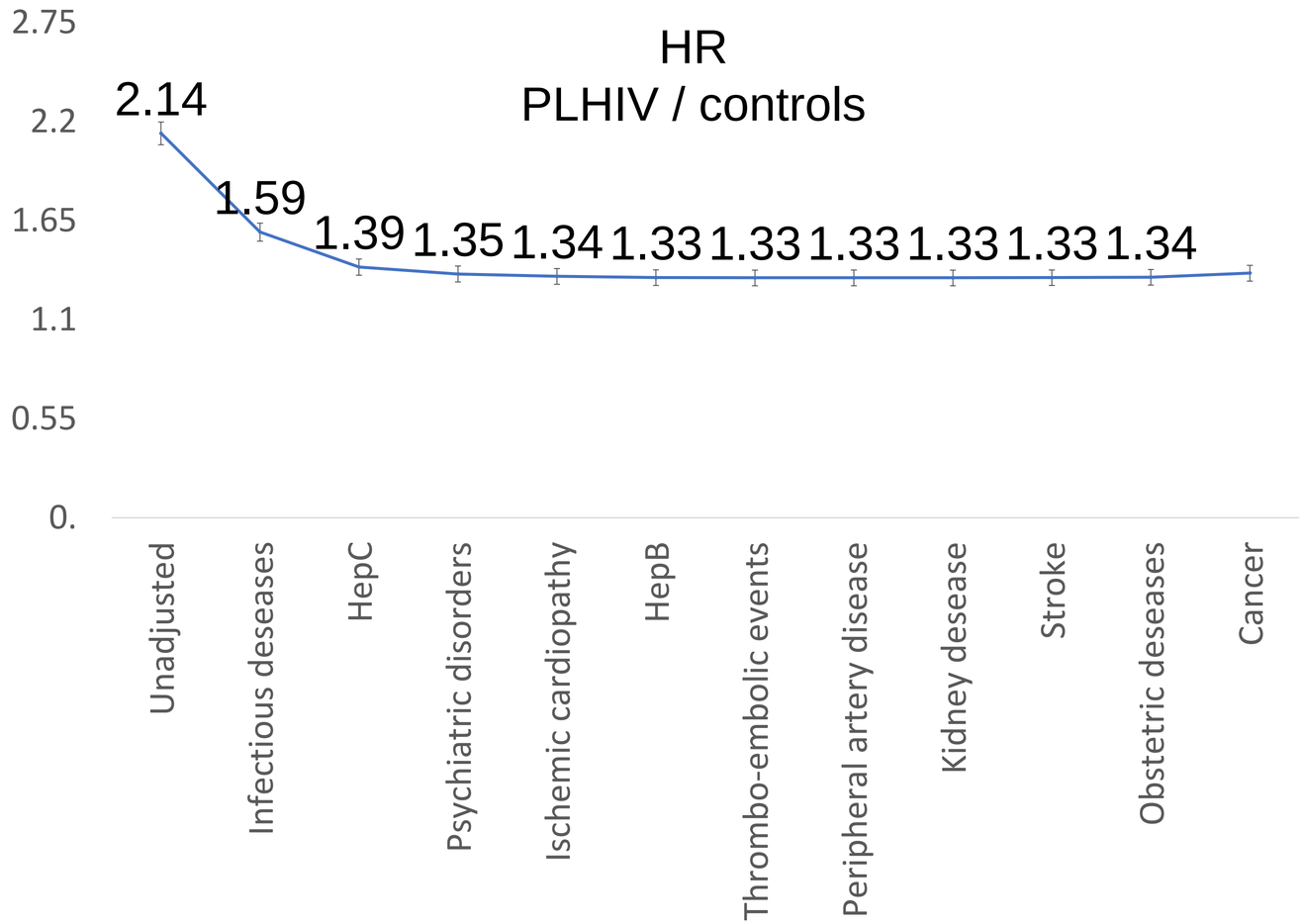
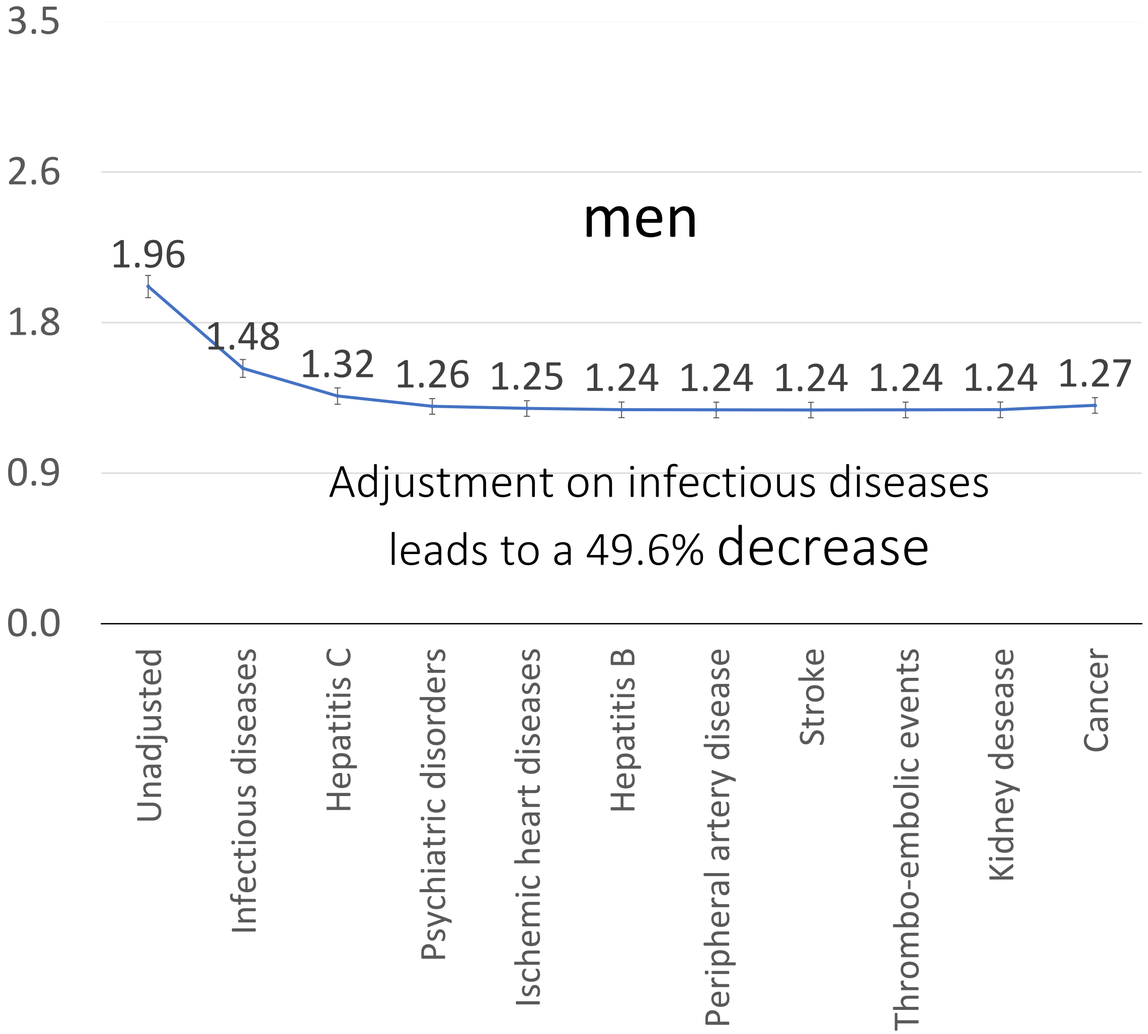
IMPACT OF COMORBIDITIES ON DEATHS

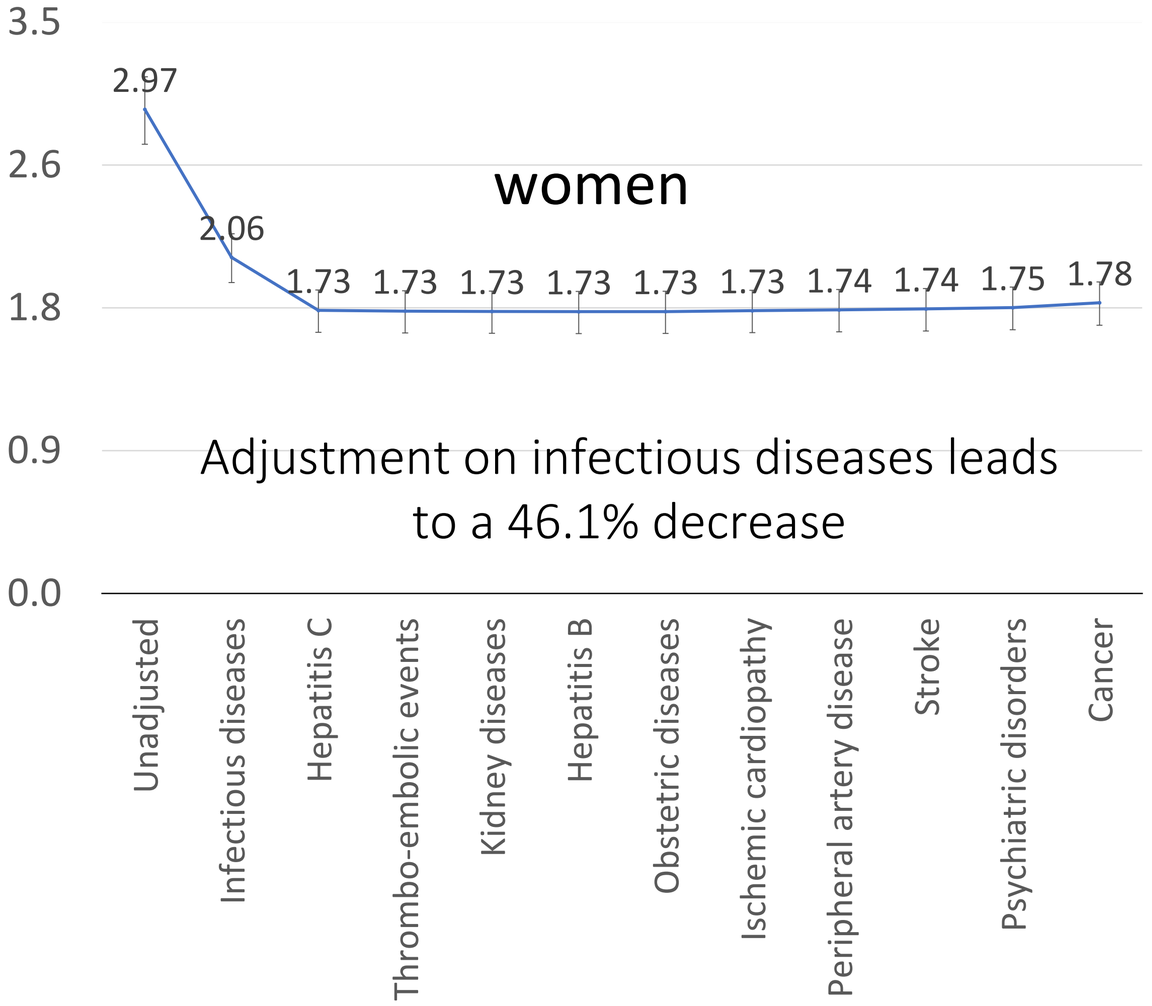
MULTIVARIATE ANALYSIS	HR PLHIV / controls	CI 95%		HR decrease
PLHIV	2.135	2.072	2.199	
Additional adjustment on:				
• Infectious deseases	1.587	1.538	1.638	48%
• Hepatitis C	1.393	1.349	1.439	17 %
• Psychiatric disorders	1.354	1.310	1.398	3%
• Ischemic cardiopathy	1.341	1.298	1.385	1 %
• HepB	1.334	1.291	1.378	<1%
• Thrombo-embolic events	1.333	1.2905	1.3773	<1%
• Peripheral artery disease	1.333	1.290	1.377	<1%
• Cancer	1.333	1.291	1.377	<1%
• Obstetric diseases	1.334	1.292	1.378	<1%
• Stroke	1.336	1.293	1.380	<1%
• Kidney diseases	1.359	1.316	1.404	<1%



IMPACT OF COMORBIDITIES ACCORDING TO GENDER

	HR PLHIV / controls	CI 95%	
men	1.96	1.898	2.027
women	2.97	2.767	3.180





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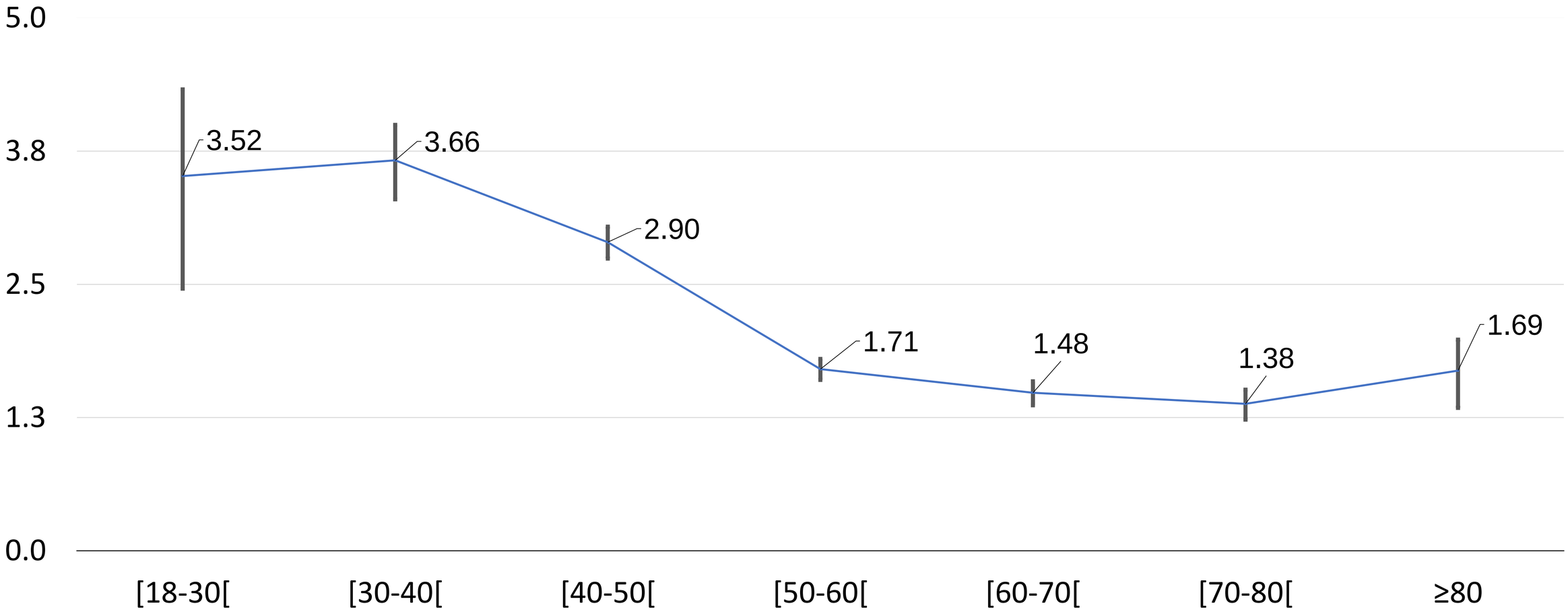
IMPACT OF COMORBIDITIES ACCORDING TO AGE



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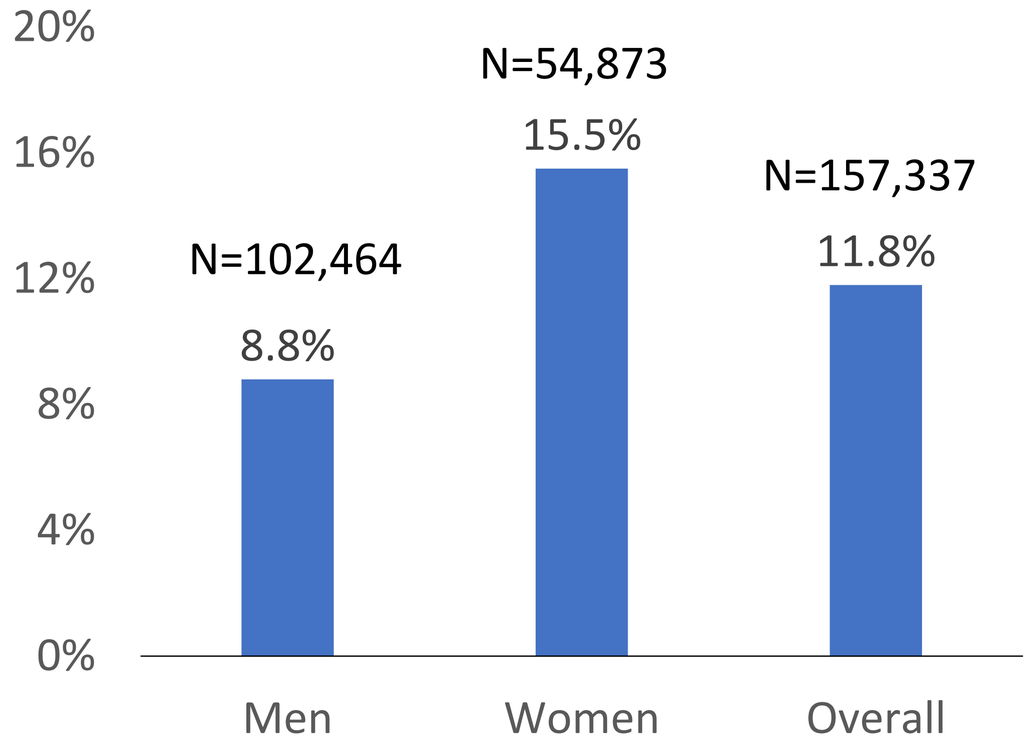
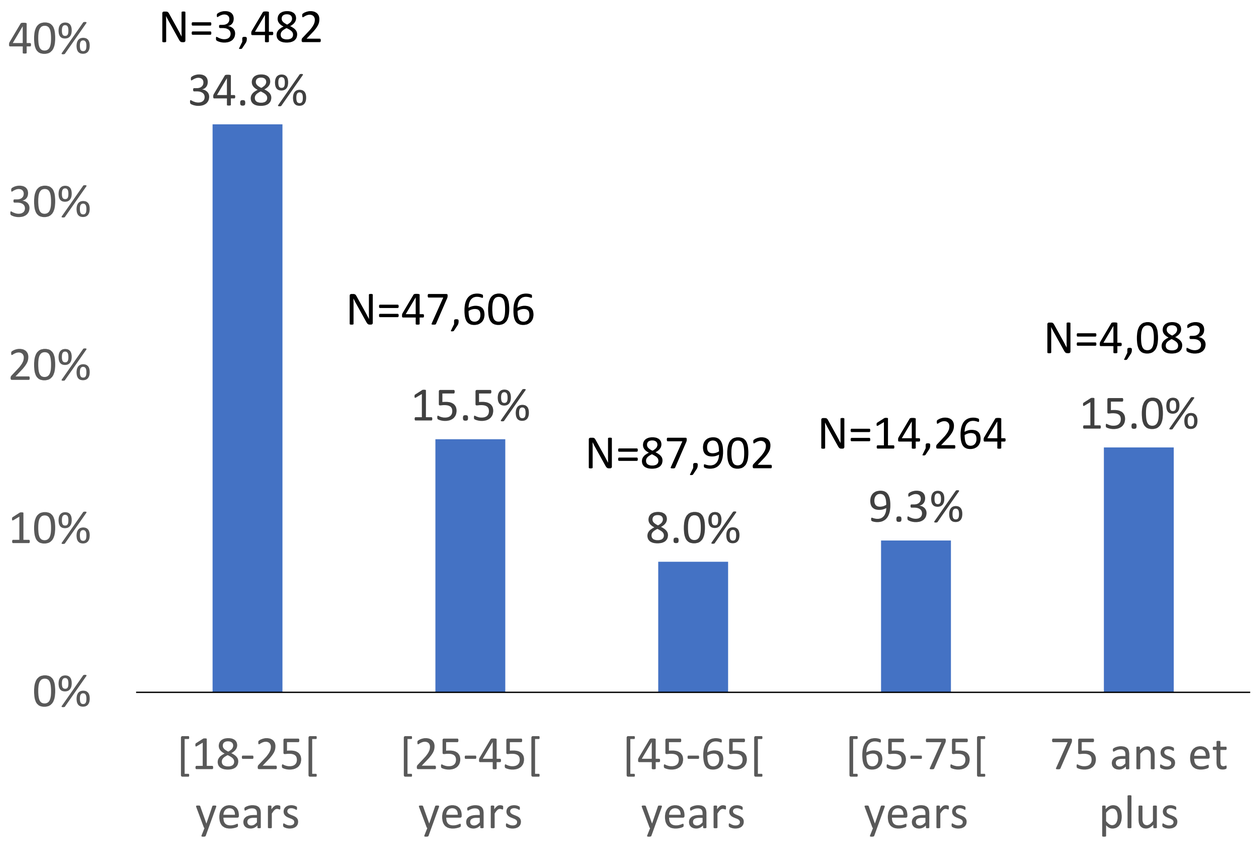
Alive on Dec 31st 2019
N = **157,337**

→

Treated with ARV in 2019
N = **139,764 (88.2%)**

2019 Proportion of untreated PLHIV is higher among women and younger subjects





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Discussion - Conclusion

Limitations

- No clinical data / viral load / CD4 cells counts
- No ethnic / behavior or lifestyle risk factor information (Tobacco, alcohol…)

strength

- Exhaustivity
- Statistical power due to the large population analyzed

Conclusions

- HIV infection doubles the risk of death
- Infectious diseases explain half of this over-mortality
- Relative over-mortality is higher among women and young patients
- Woman and young PLHIV are less treated
- Real time dispensation of antiretroviral drugs for the year 2019 is lower than expected

Further studies should explore the reasons for the overmortality / undertreatment of women and young adults in order to settle public health policies

- Many thanks !

CEMKA

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SNDS
Système national des données de santé

SÉCURITÉ SOCIALE
l'Assurance Maladie
Agir ensemble, protéger chacun

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