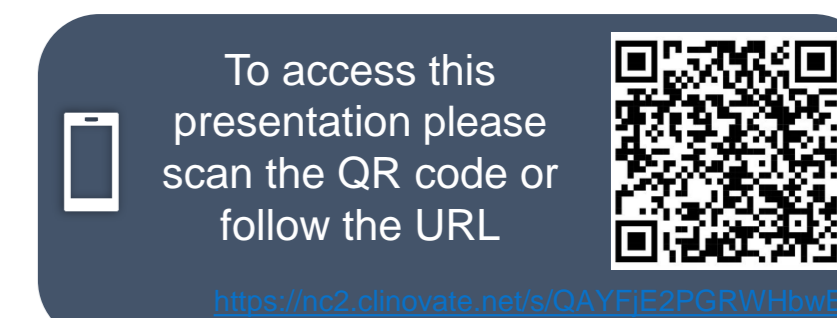# The COCOVIH study: Adherence to HIV treatment in 2019 using the French national health insurance claims data base

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HIV Drug Therapy GLASGOW 2022

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Background

- COCOVIH is an observational study collecting real-world data from 2006-2019 to evaluate sociodemographic characteristics, comorbidities and antiretroviral treatment of people living with HIV (PLHIV) in France.
- This evaluation focuses on treatment adherence in 2019 and the covariables associated with adherence.
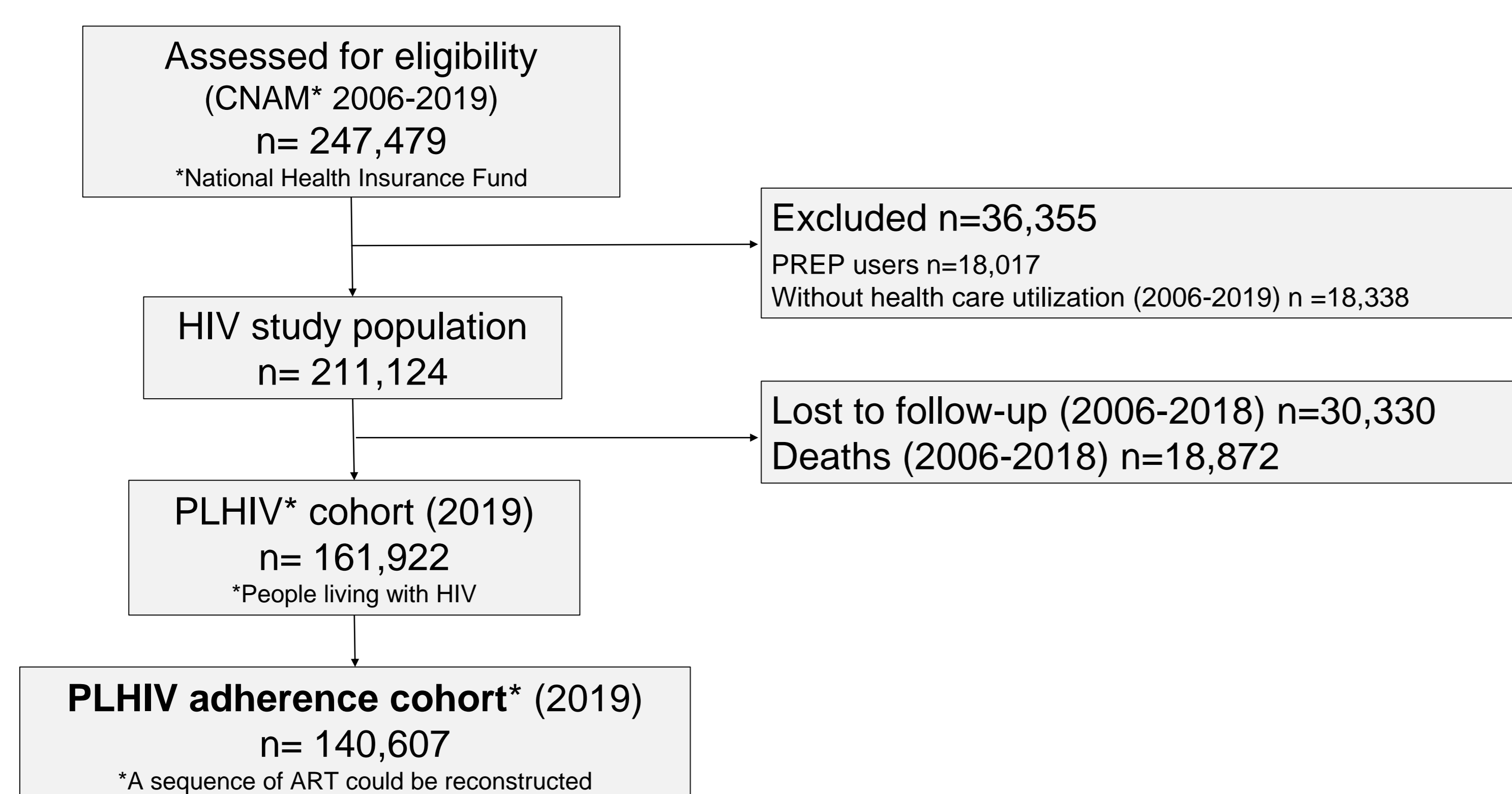
Methods

- COCOVIH draws upon anonymized records from the SNDS (National Health Database) which includes the French population registered in CNAM (National Health Insurance Fund). The comprehensive SNDS merges a wide array of information about 66.3 million French citizens from outpatient claims, public and private hospitals, and the death registry, by using the unique insurance identification number for each person.
- PLHIV were identified based on ICD-10 HIV diagnoses, HIV specific laboratory tests, and/or prescription of antiretroviral therapy (ART). Excluded were recipients of ART without corresponding HIV diagnosis, notably PrEP users.
- Adherence was quantified by the medication possession ratio (MPR) (issued tablets divided by the calculated number of tablets recommended during the last available treatment sequence).
- Variables of interest included gender, age, type of ART, relevant comorbidities/long-term conditions and being CMUc recipient (under specific coverage for economically challenged citizens).

Results

STUDY POPULATION

- From CNAM, a total of 161,922 PLHIV were identified for the year 2019 (median age 50 years (IQR, 41-58), 65.0% were male, 36.8% lived in the capital region Île-de-France, and 20.1% were CMUc/AME recipients.
- Of 161,922 PLHIV, 141,685 (87.5%) were treated with ART. For N=140,607, a sequence of ART could be reconstructed, encompassing at least two months of the same treatment. These 140,607 participants formed the adherence cohort 2019 (Figure 1).
- 84.4% received triple therapy; the mean (SD) number of monthly drug issuances per year was 10.2 (3.1).

Figure 1. Flow Diagram: selection of the adherence cohort

Assessed for eligibility (CNAM* 2006-2019) n= 247,479
*National Health Insurance Fund

Excluded n=36,355
PREP users n=18,017
Without health care utilization (2006-2019) n =18,338

HIV study population n= 211,124

Lost to follow-up (2006-2018) n=30,330
Deaths (2006-2018) n=18,872

PLHIV* cohort (2019) n= 161,922
*People living with HIV

PLHIV adherence cohort* (2019) n= 140,607
*A sequence of ART could be reconstructed

MPR IN PLHIV OF ADHERENCE COHORT

- Mean (SD) MPR was 82.5% (22.7); 12.7% with a MPR <50%, 57% with a MPR >90%.

**Table 1. MPR in PLHIV stratified by sociodemographic characteristics**

PLHIV treated in 2019			MPR >80	MPR >90
Total, N (%)		140,607 (100%)		
Gender N (%)	male	93,926 (66.8%)	68.3%	59.1%
	female	46,681 (33.2%)	63.0%	52.8%
Age, years, N (%)	<15 years	494 (0.4%)	56.7%	49.0%
	15 - <25 years	2,463 (1.8%)	60.3%	50.4%
	25 - <65 years	120,939 (86.0%)	66.5%	56.6%
	≥65 years	16,711 (11.9%)	68.3%	61.0%
Recipient of social benefits CMUc in 2019, N (%)	Yes	24,518 (17.4%)	64.8%	54.1%

PLHIV, People living with HIV; MPR, Medication Possession Ratio; CMUc, Supplementary Universal Health Coverage.

MPR DURING 2006 – 2019

- The number of treated PLHIV has risen over the years, from 79.5% in 2010 to 87.5% in 2019.
- MPR has increased over the past years: 66.9% of HIV patients identified in 2018 have an MPR >90% versus 54.1% of patients diagnosed in 2006 or earlier (Figure 2).
- The proportion with MPR >90% was lowest in the region Île-de-France (53.9%).

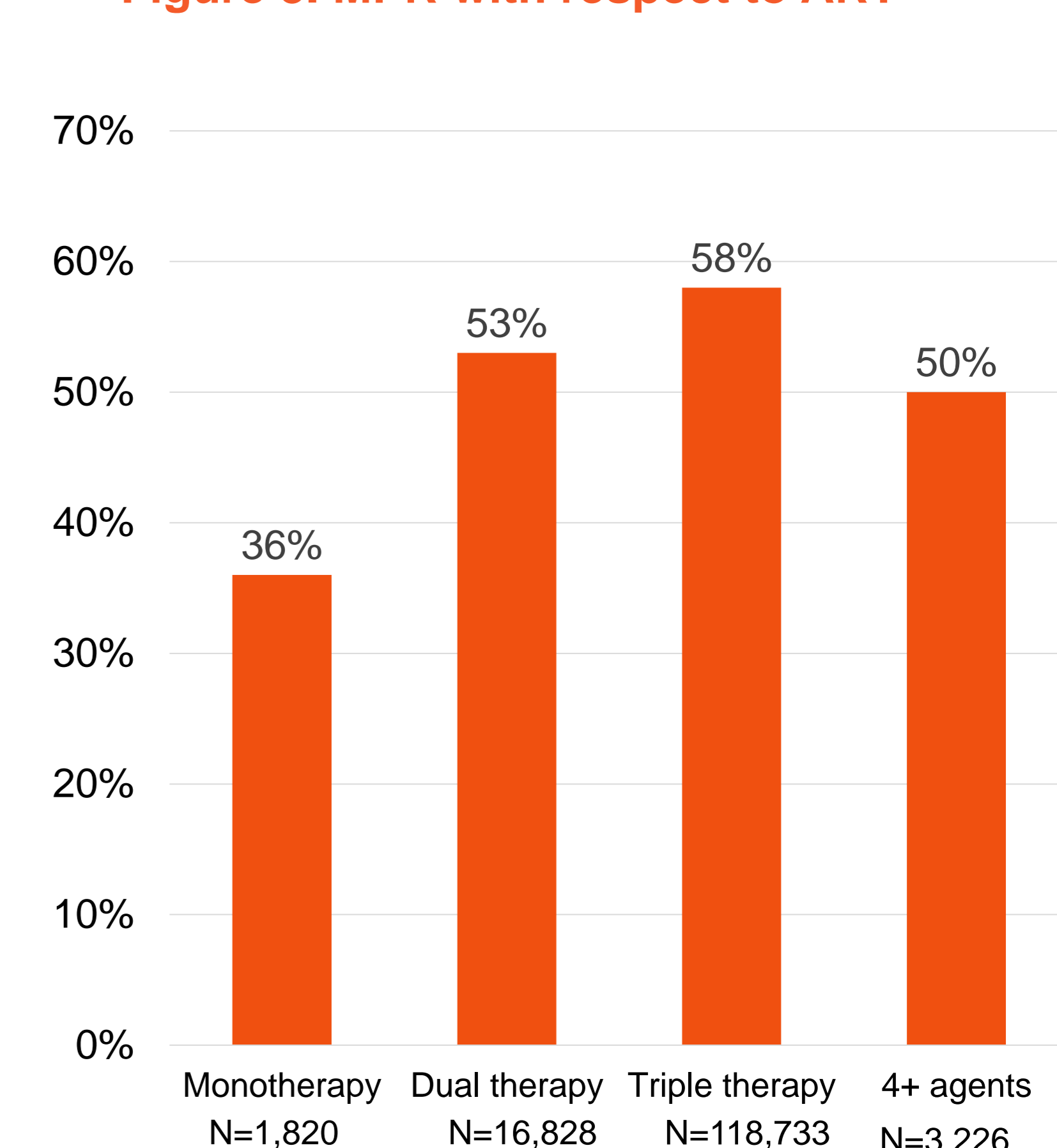**Figure 2. MPR corresponding to year of diagnosis**
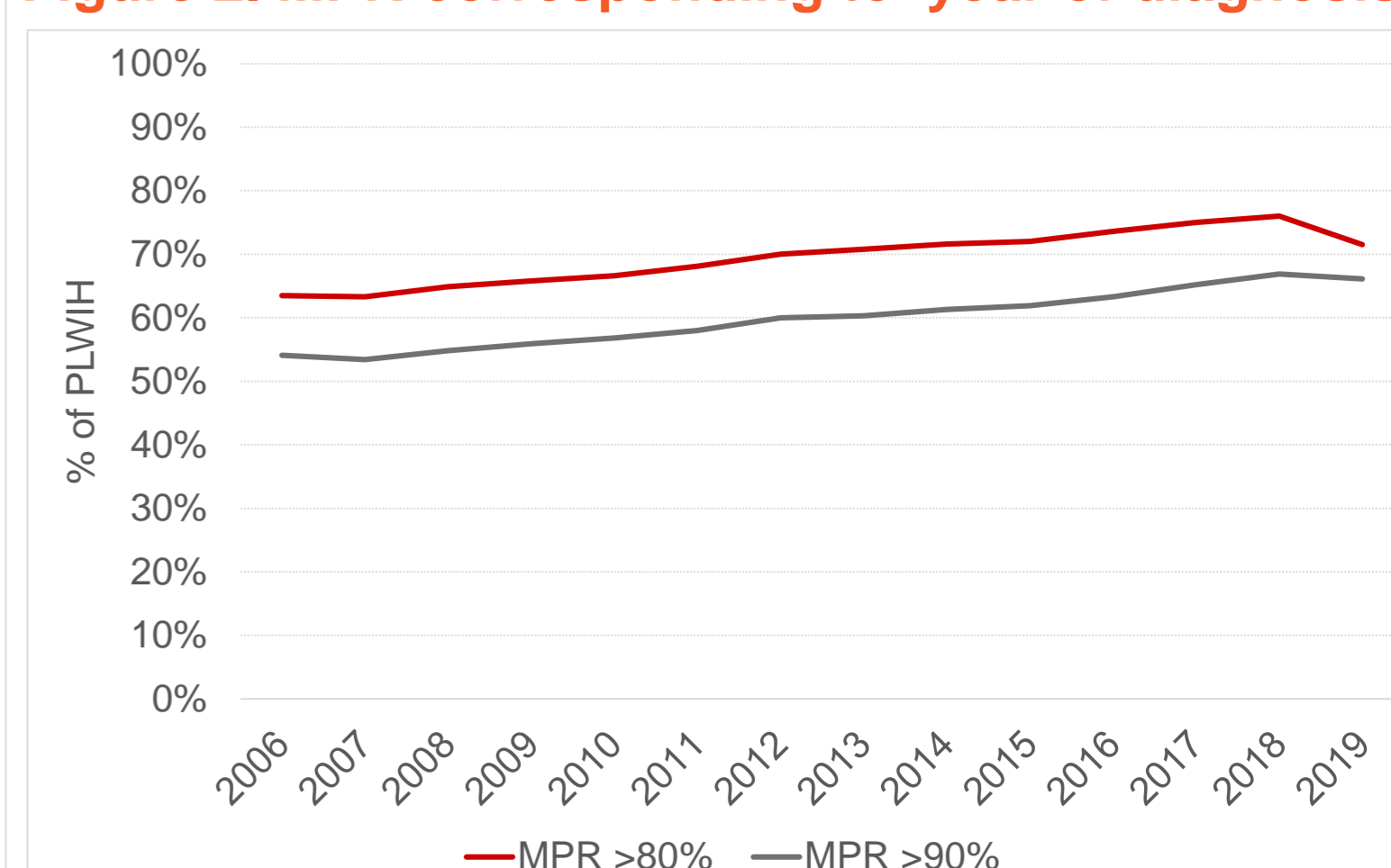
MPR WITH RESPECT TO COMORBIDITIES AND ART

- 69% had relevant comorbidities, 6% no comorbidities, with no difference in MPR (mean (SD) MPR: 82.5% (22.4) with comorbidities, 82.3% (23.5) without).
- Relevant comorbidities and rates with MPR >90% are shown in Table 2.
- Of PLHIV on monotherapy, 36% had an MPR >90% vs. 58% on triple therapy (Figure 3).

Table 2. MPR in PLHIV with comorbidities

Relevant Comorbidities	N	% with MPR >90%
Chronic nephropathy	1,227	50.2%
Renal insufficiency	757	46.6%
Tuberculosis	1,767	50.1%
Use of psychoactive substances	15,329	52.3%
Hepatitis C infection	15,423	55.2%
Chronic hepatitis B	7,122	55.4%
Stroke or transient ischemic attack	3,155	55.5%
Depression	35,092	56.7%
Neurosis	39,266	56.7%
Hypertension	33,649	57.3%
Unstable angina, myocardial infarction, or chronic coronary artery disease, or percutaneous revascularization	10,407	58.0%
Diabetes	11,369	59.6%
Dyslipidemia	22,495	59.9%

Figure 3. MPR with respect to ART

Monotherapy N=1,820 — 36%
Dual therapy N=16,828 — 53%
Triple therapy N=118,733 — 58%
4+ agents N=3,226 — 50%

FACTORS ASSOCIATED WITH HIGH MPR

A multivariate model was performed to predict factors for better adherence. Factors associated with an MPR >90% are shown in Table 3.

Table 3. MPR >90%: Results of multivariate logistic regression analysis

		OR^	95% CI^^	
Age (years) (Reference category <15)	15-29	1.042	0.866	1.254
	30-39	**1.307**	1.090	1.567
	40-49	**1.513**	1.263	1.812
	50-64	**1.805**	1.506	2.163
	65-74	**2.110**	1.755	2.536
	75+	**1.987**	1.639	2.409
Sex (Ref. female)	male	**1.220**	1.191	1.248
CMUc recipient* (Ref. no)	yes	**0.830**	0.806	0.855
Index year** (Ref. ≤2006-2009)	2010-2012	**1.298**	1.251	1.347
	2013-2015	**1.546**	1.488	1.607
	2015-2017	**1.886**	1.801	1.975
	2018-2019	**2.211**	2.106	2.321
Prevalent comorbidities (Ref. no)	yes	1.012	0.986	1.038
Type of ART (Ref. monotherapy)	dual therapy	**1.932**	1.747	2.137
	triple therapy	**2.310**	2.096	2.545
	≥ quadruple therapy	**1.707**	1.515	1.922

^OR, odds ratio; **bold OR: p<0.05;** ^^CI confidence interval; *CMUc = Supplementary Universal Health Coverage; **Year of HIV diagnosis.

Conclusions

- This comprehensive real-world sample of French PLHIV in 2019 showed that adherence gradually increased with more recent HIV diagnosis, possibly reflecting advances in ART tolerability or single tablet regimens.
- Male sex, advanced age, triple therapy and not being a CMUc recipient were identified as factors independently associated with better adherence.