

Projection of age and time since ART initiation of persons living with HIV in 2030 : estimates for France



Lise Marty¹, Yakhara Diawara¹, Antoine Rachas², Sophie Grabar³, Dominique Costagliola¹, Virginie Supervie¹

¹ Sorbonne Université, INSERM, Institut Pierre Louis d'Epidémiologie et de Santé Publique, Paris, France

² Direction de la Stratégie, des Etudes et des Statistiques, French national health insurance (CNAM), France

³ Sorbonne Université, INSERM, Institut Pierre Louis d'Epidémiologie et de Santé Publique, AP-HP, Hôpital St Antoine, Paris, France

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BACKGROUND

Since 1996, **life expectancy (LE) of people living with diagnosed HIV (PLdHIV) has been steadily increasing, until approaching that of the general population** (1,2). HIV populations are therefore aging, implying new challenges in HIV care. To anticipate the future health care needs, it is essential to **forecast the number and age of HIV populations**. The **time period at which PLdHIV started ART** is also key, as it influences mortality and morbidity risks (3). Here, we projected the total number, age distribution and time spent since ART initiation, by sex, of adult PLdHIV in France up to 2030. We also provide updated estimates of life expectancy (LE), by sex and period of ART initiation of adult PLdHIV currently on ART.

DATA SOURCES

- **The permanent beneficiary sample (Echantillon Généraliste des Bénéficiaires, EGB)**: representative cohort of the population covered by health insurance schemes (sample of 1/97th), monitoring health care consumption and long-term illness status since 2004 (4).
- **The French Hospital Database on HIV (ANRS CO4-FHDH)**: nationwide open hospital cohort, created in 1989 and representative of the adult PLdHIV population receiving medical care in France (5).
- **Routine national HIV surveillance** on persons newly diagnosed with HIV (6).

METHODS

- **Projection of age distribution and time since ART initiation**
We projected the age distribution of adult PLdHIV up to 2030 using an age-structured matrix model and estimates of: (i) the number of adult PLdHIV in 2018, (ii) three scenarios for newly diagnosed cases over 2019-2030, and (iii) estimates of mortality rates. The distributions of time since ART initiation of adult PLdHIV were also projected.
- **Projected scenarios for newly diagnosed cases over 2019-2030** :
 - a 30% decrease scenario (S1) : a linear decrease with 30% fewer cases in 2030;
 - a status quo scenario (S2) : a steady annual number of cases over 2019-2030;
 - a epidemic elimination (S3) : a linear decrease up to 0 case in 2030.
- **Life Expectancy**
Using a life table method, we estimated LE for adult PLdHIV on ART in France, by sex, age and ART initiation period. *LE in the general population in 2018 were obtained from the Human Mortality Database (<https://www.mortality.org>).

RESULTS

I. Projected population size and age of adult PLdHIV (Figure)

In 2018, 161,125 adults (33% women) were living with diagnosed HIV.

- Under S1, this number would be 195,246 **in 2030** (i.e. +20%).
- It would be 207,972 under S2, and 167,221 under S3.

Under all scenarios, the **age distribution of the adult PLdHIV would shift towards older ages over 2018-2030**: the proportion of individuals aged

- ≥ 50 would increase from 61% to 68% for men, from 44% to 63% for women;
- ≥ 60 would double, from 24% to 47% for men, and from 17% to 36% for women;
- ≥ 70 would double, from 8% to 18% for men, 7% to 14% for women.

Whatever the scenario, **in 2030, there would be ~83,400 individuals (~28% women) living with diagnosed HIV aged ≥ 60 years and ~33,100 individuals aged ≥ 70 (~27% women)**, compared to respectively 35,715 (~25% women) and 12,582 (~27% women) in 2018.

II. Projected time since ART initiation (Figure)

Over 2018-2030, the proportion of individuals with ≥ 20 years of ART exposure (i.e. starting ART before 2010) will increase:

- Overall, from 27% to 42% for men and from 21% to 44% for women;
- Among those aged ≥ 60 , from 43% to 68% for men and from 33% to 67% for women.

The proportion of individuals **with ≥ 30 years of ART exposure** (i.e. starting ART before 2000) will increase:

- Overall, from $<1\%$ to 21% for men, and from $<1\%$ to 18% for women;
- Among those aged ≥ 60 , from 1% to 39% for men, and from $<1\%$ to 37% for women.

In 2030, 83,659 individuals (34% women) would have started ART ≥ 20 years ago, i.e. before 2010, including 38,492 individuals (30% women) that would have started ART ≥ 30 years ago - versus respectively 40,667 and 573 in 2018 - with the vast majority of them being aged ≥ 60 .

III. Life expectancy (Table)

- LE was higher for individuals who initiated ART during the most recent period, for all ages and for both sex;
- For all periods and ages, women had higher LE than men;
- Higher gap in LE compared to the general population for women than for men.

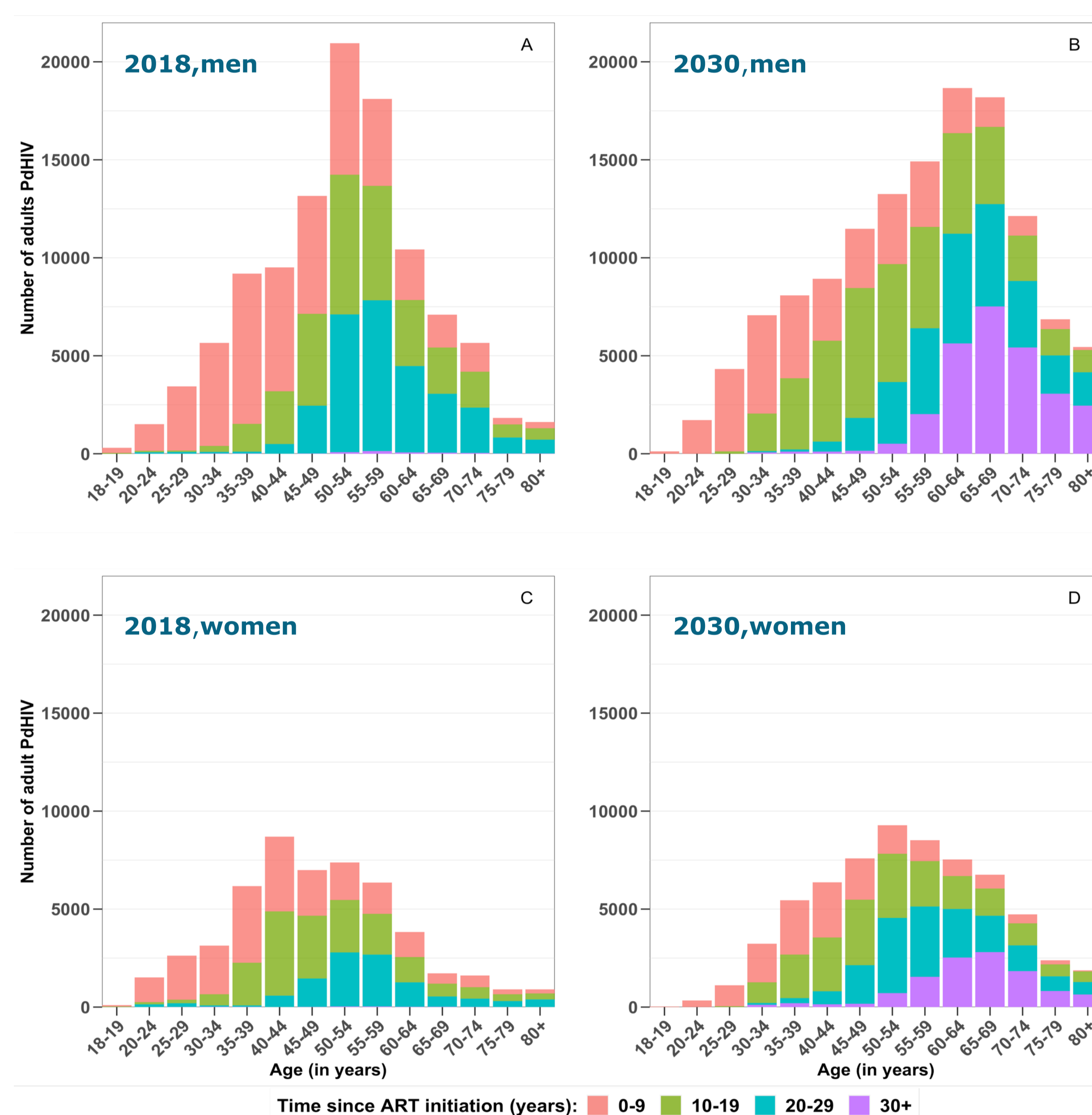


Figure. Numbers and age distributions of adult PLdHIV in 2018 and 2030, stratified by time since ART initiation (in years): for men (A and B) and women (C and D), in 2018 (A and C) and in 2030 (B and D) under scenario 1 (30% decrease in newly diagnosed HIV cases over 2018-2030).

Period of ART initiation	20 years in 2018		60 years in 2018	
	Men	Women	Men	Women
1985 - 1996	x	x	19.7 (19.1 - 20.3)	21.6 (20.4 - 22.8)
1997 - 2005	54.4 (52.1 - 56.7)	56.9 (54.9 - 58.9)	20.5 (20.0 - 21.0)	22.1 (21.2 - 23.0)
2006 - 2010	56.8 (53.9 - 59.7)	60.0 (57.7 - 62.3)	22.5 (21.5 - 23.5)	24.4 (23.1 - 25.7)
2011 - 2016	57.7 (56.5 - 58.9)	59.1 (57.3 - 60.9)	22.9 (21.8 - 24.0)	23.9 (22.3 - 25.5)
General population*	60.1	65.9	23.3	27.7

Table. Remaining life expectancy (in years) according to the age reached in 2018, for the general population* and for HIV-infected men and women who initiated ART, by period of ART initiation.

STRENGTHS & LIMITS

- Our approach accounts for the **impact of the ART initiation period on mortality** to project the total number and age distribution of adult PLdHIV. To the best of our knowledge, this is **the first projection of the time spent since ART initiation**.
- However, our study has also a number of **limitations**. We assumed that mortality rates estimated over 2011-2016 will remain constant over 2017-2030; Potential inaccurate adjustment of data on deaths in the FHDH may have occurred; No data on exposure group were available in the EGB; We excluded individuals aged <18 years in the population size estimates.

CONCLUSIONS

- By 2030, the HIV epidemic in France would be growing by more than 20% and aging, with a doubling of the proportions of individuals aged ≥ 60 and ≥ 70 ;
- 2/3 of the adult PLdHIV would be aged ≥ 50 , 50% aged ≥ 60 , 20% aged ≥ 70 ;
- Whatever the projected scenarios for newly diagnosed cases over 2019-2030, around 83,000 individuals will be aged ≥ 60 in 2030, including around 33,000 aged ≥ 70 ;
- In 2030, there will be more that 38,000 individuals who would have started ART more than 30 years ago (i.e. before 2000), with long exposure to the first generation of transcriptase and protease inhibitors, associated with higher toxicities;
- The gap in LE compared to the general population was more important for women than for men, which could be explained by differences in socio-economic levels and in access to health care system between born-abroad and born-in-France individuals.

REFERENCES

(1)Antiretroviral Therapy Cohort Collaboration. Lancet HIV. 2017
(2)Samji H, et al.. PloS One. 2013

(3)Guaraldi Get al. PloS One. 2015
(4)Tuppin P, et al. Rev Epidemiol Sante Publique. 2017
(5)Mary-Krause et al. Int J Epidemiol. 2014

(6) Lot F, et al.. Euro Surveill. 2004
(7) Sécurité Sociale - l'Assurance maladie. <https://assurance-maladie.ameli.fr/etudes-et-donnees/par-theme/pathologies/cartographie-assurance-maladie>