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Age-associated dementia among older people with HIV in the United States: a model-based analysis

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Among people with HIV now over age 55, almost 20% are likely to develop age-associated dementia over their lifetime.

BACKGROUND

- The population with HIV in the US is growing older.
- In 2015, 25-30% of people with HIV (PWH) in the US (~300,000) were over age 55 and at risk for developing age-associated dementias (AAD), including Alzheimer's disease and vascular dementias.

OBJECTIVE

- To project the lifetime cumulative incidence and mortality associated with AAD among diagnosed PWH ≥55y, compared to the general population and those at high risk for HIV.

METHODS

- We expanded the Cost-Effectiveness of Preventing AIDS Complications-US (CEPAC-US) model to incorporate age- and sex-stratified risks of AAD.
- Using published data from populations without HIV, we estimated AAD prevalence, incidence, progression and associated mortality (Table 1).
- We estimated AAD stage duration in months: mean (SD)
  (1) Mild to moderate AAD: 43.6 (37.0)
  (2) Moderate to severe AAD: 24.0 (16.7)
- We validated the model by comparing results to the survival and AAD cumulative incidence observed in the Framingham, Kaiser Permanente, and Rotterdam cohorts (not shown).
- We simulated 3 cohorts of people ≥55y in 2015:
  (1) General population (2) People at high risk for HIV (3) PWH.
- Among people at high risk for HIV and PWH, we adjusted mortality by a relative mortality ratio (RMR) given the proportion of the population with the following risk behaviors: (1) MSM, (2) ever PWID, and (3) those of low socioeconomic status, used as a proxy for high-risk heterosexuals.
- We performed sensitivity analysis on HIV-specific (e.g., loss to follow-up [LTFU]) and AAD-specific (e.g. AAD incidence) parameters, as well as the impact of a 5y forward-shift in AAD incidence and associated mortality (i.e., premature aging).

METHODS (CONTINUED)

Table 1. Base case input parameters for an analysis of AAD in PWH in the US

Input parameter	Base case value	
Cohort characteristics	**On ART**	**Not in care**
Age, years, mean (SD) [1]	61.7 (6.0)	60.6 (6.0)
Initial CD4 count, cells/ μL, mean (SD) [2,3]	600 (313)	325 (53)
Treatment and engagement in care	**All PWH**	
48-week ART efficacy, % [4,5]	88-93	
In care at model start, % [1]	60	
Loss to follow-up, monthly % [6]	0.1-7.5	
Return to care, monthly % [6]	1.5	
Relative Mortality Ratio by Risk Behavior (%) [1,7,8]	**Males**	**Females**
Men who have sex with men ≥55y	1.62 (48%)	--
People who ever inject drugs ≥55y	1.84 (19%)	1.93 (7%)
High-risk heterosexuals ≥55y	2.47 (10%)	3.34 (16%)

AAD-specific parameters	Prevalence % at model start [9]		Incidence per 1,000 PYs [10]		Mortality % monthly* [11,12]	
Age, years	**M**	**F**	**M**	**F**	**M**	**F**
60-64	1.3	1.0	4.5	3.3	0.24	0.19
65-69	2.1	1.8	7.4	3.8	0.36	0.29
70-74	3.7	3.3	11.4	7.9	0.57	0.49
75-79	6.8	6.4	21.1	18.1	0.85	0.76
80-84	12.3	12.5	49.2	44.7	1.26	1.09
85+	33.4	38.0	71.7	88.6	4.05	3.07

ART: antiretroviral therapy; **AAD:** age-associated dementia; **PY:** person year
* Among people with severe AAD

TABLE REFERENCES

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RESULTS

Table 2. Model-projected lifetime AAD cumulative incidence and life expectancy

	Lifetime AAD cumulative incidence, %			Life expectancy, years		
Population	**M**	**F**	**All***	**M**	**F**	**All***
Base case:						
General population	36	44	38	21.2	24.2	21.9
People at high risk for HIV	23	22	23	17.0	17.2	17.0
People with HIV	18	17	18	14.5	14.6	14.5

* 77% males and 23% females, per 2015 CDC data regarding people ≥55y diagnosed with HIV.

RESULTS (CONTINUED)

Figure Legend

Base Case
- General population
- People at high risk for HIV
- People with HIV (PWH)

Sensitivity Analyses
- PWH, 2x AAD incidence
- PWH, 5y premature aging
- PWH, no LTFU

Figure 1. Projected lifetime AAD cumulative incidence

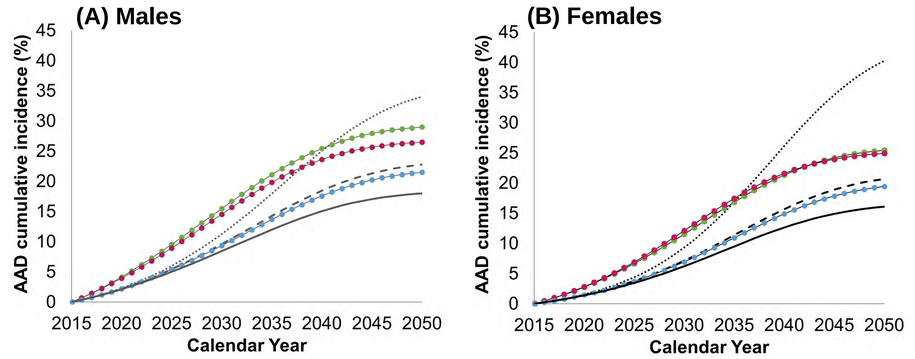
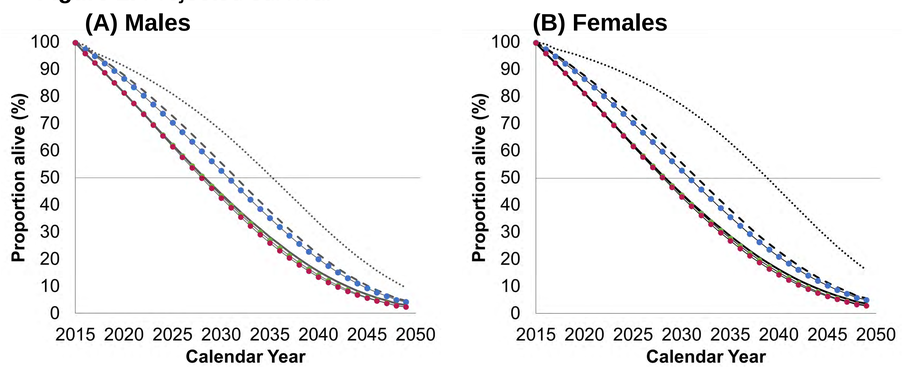


Figure 2. Projected survival



LIMITATIONS

- Whether HIV-associated neurocognitive disorder (HAND) is synergistic or antagonistic with AAD is currently unknown; HAND is not included in our projections.
- Estimates of AAD incidence and AAD-associated mortality are uncertain among PWH.

CONCLUSIONS

- We project that almost 20% of PWH now ≥55y in the US are likely to develop AAD over their lifetime.
- AAD cumulative incidence will be greater if the competing risk of mortality from HIV is reduced or if the risk of AAD is higher among PWH than those without HIV.