

# Is the incidence of age-related non-AIDS conditions higher among people living with HIV compared to age-matched people living without HIV?

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## OBJECTIVE

To assess and compare the incidence of common age-related non-AIDS conditions (NAC) among optimally treated people living with HIV (PLHIV) and their age and lifestyle-matched HIV-negative person over 9-10 years follow-up

## METHODS

### Study Design

- Retrospective cohort study (9-10 years follow-up)
- Baseline - October 2011 and October 2012
- Study endpoint – April 2021

### Participants

- 254 PLHIV and 69 age and lifestyle matched HIV-negative gay and bisexual men from Holdsworth House Medical Practice in Sydney.
- Mean age - 49 years (SD=10.2)
- 15% of PLHIV had a history of AIDS at baseline
- 78% of PLHIV with HIV RNA<50 copies/ml at baseline and 90% at the end of the follow-up

### Procedures

#### Baseline Data Collection (predictors)

Category	Detailed variables or tool used to assess
Mood status	Depression Anxiety Stress Scales (DASS)
Coinfections	Hepatitis B and Hepatitis C
Instrumental activities of daily living (IADL)	Modified version of the Lawton and Brody scale
Substance and Alcohol use	Mini International Neuropsychiatric Interview alcohol and substance use sections
CVD risk	Smoking, hypertension, hypercholesterolemia
HIV-related	ART status, duration of cART, current and nadir CD4, CD8 count, CDC Stage, and HIV viral load
Cognitive Screen	Cogstate Computerized Battery (CCB) (42% of PLHIV had HIV-associated Neurocognitive Disorder (HAND) at baseline)

### Outcome Data

The incidence data on the following age-related NAC was collected by reviewing the medical records.

<b>Non-HIV neurological disorders</b> (all types of strokes, Parkinson's disease, and motor neuron disease, mild cognitive impairment (MCI) and all types of dementia except HIV-associated dementia)
<b>Cardiovascular disease (CVD)</b> (atrial fibrillation, ischemic heart disease, hypertensive heart disease, valvular heart disease, and pulmonary hypertension)
<b>Chronic kidney disease</b>
<b>Chronic liver disease (cirrhosis)</b>
<b>Chronic lung disease (chronic obstructive pulmonary disease)</b>
<b>Non-AIDS cancers</b> (all cancers except skin cancers and AIDS cancers)
<b>Osteoporosis</b>
<b>Diabetes</b>

### Statistical Analysis

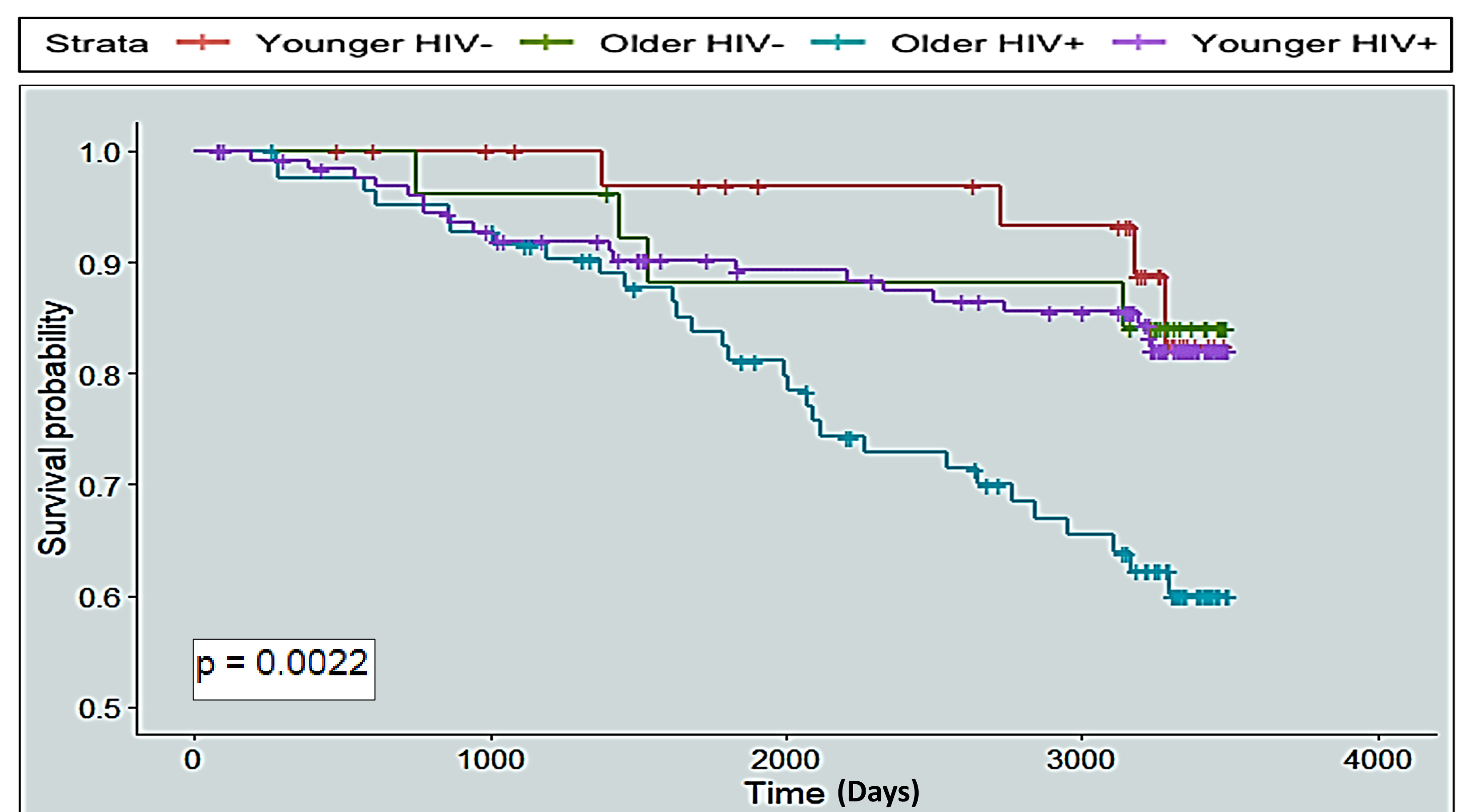
- **Censoring** – LTFU cases, transferred-out cases, death cases (from a cause apart from the outcomes of interest), and participants who did not develop any of the age-related NAC until the end of follow-up
- **Incidence rates** – per 1,000 person years
- **Kaplan-Meier curves** to compare the incidence of individual and combined NAC among younger (baseline age<50) and older (baseline age≥50) PLHIV and younger and older HIV-negative participants
- **Multivariate cox regression** to identify the individual and interaction effects of HIV status and baseline age on the risk of combined NAC adjusting the effects of covariates. Variables were chosen based on univariate results.

## RESULTS

\*p<0.05; \*\*p<0.01, \*\*\*p<0.001

Incidence rate (by 1,000 person years)	Younger HIV-negative	Older HIV-negative	Younger PLHIV	Older PLHIV
Non-HIV Neurological disorders	0	3.58 (0.18, 17.67)	0	5.37 (1.97, 11.92)
Chronic kidney, liver, and lung diseases	0	7.21 (1.21, 23.82)	6.44 (2.82, 12.75)	4.6 (1.46, 11.11)
Cancers	0	7.1 (1.19, 23.46)	4.6 (1.69, 10.21)	11.51 (0.59, 2.05)
Cardiovascular diseases***	7.23 (1.21, 23.91)	0	3.74 (1.19, 9.02)	23.08 (14.31, 35.39)
Diabetes	7.06 (1.18, 23.33)	11.49 (0.29, 3.13)	5.52 (2.24, 11.49)	9.27 (4.31, 17.61)
Osteoporosis***	0	0	0.92 (0.46, 45.46)	11.3 (0.57, 2.01)
Overall NAC burden**	14.50 (4.61, 34.98)	18.54 (5.89, 44.73)	21.03 (13.21, 31.91)	49.81 (34.00, 70.61)

### Kaplan-Meier curve to compare the incidence of overall NAC by HIV status and age



### Multivariate cox regression model among the whole sample (Outcome – overall NAC)

	Hazard Ratio	95% CI
HIV status (Positive)	2.23*	1.03-4.82
Baseline age (Years)	1.09*	1.06-1.13
Baseline DASS depression score	1.02	0.98-1.05
Baseline DASS anxiety score	1.02	0.97-1.08
Baseline IADL Score	0.99	0.90-1.09
Smoking at baseline (Yes)	2.01*	1.12-3.62
Hypertension at baseline (Yes)	1.00	0.54-1.83
History of psychiatric disorder at baseline (Yes)	3.37	0.96-11.89

### Multivariate cox regression model among PLHIV only sample (Outcome – overall NAC)

	Hazard Ratio	95% CI
Baseline age (Years)	1.07***	1.03-1.12
Baseline DASS depression score	1.03	0.98-1.07
Baseline DASS anxiety score	1.02	0.97-1.08
History of psychiatric disorder at baseline (Yes)	3.16	0.87-11.56
Current CD4 cell count (cp/mL)	0.99	0.98-1.00
Current CD4:CD8 ratio	0.60	0.29-1.24
Duration of ART at baseline (Years)	1.03	0.99-1.08
Neurocognitive competence (CNS AIDS conditions before baseline + HAND diagnosis at baseline assessment)	1.00	0.52-1.94
<b>Current ART Regimen (just before/at the time of diagnosis with NAC)</b>		
Abacavir containing regimen	2.14*	1.12-4.10
Efavirenz containing regimen	6.42**	2.02-20.31
Atazanavir containing regimen	3.47*	1.18-10.21
Darunavir containing regimen	2.65**	1.27-5.53

## CONCLUSIONS

- **Higher risks of NAC among older PLHIV warrant consideration of public health interventions and individualized holistic care plans for effective prevention, detection, and management.**
- **Clinicians should consider individual patients' factors such as age, lifestyle and existing medical conditions when selecting ARV drugs and should regularly monitor adverse effects and possible associated conditions.**

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