PREDICTORS OF NEUROCOGNITIVE DECLINE AMONG AVIREMIC INDIVIDUALS IN THE CHARTER COHORT

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Background

- Limited information is available on the predictors of neurocognitive (NC) decline in individuals with good virological control.
- Identification of modifiable risk factors that predict decline would support the development of targeted interventions to minimize NC decline in higher-risk individuals.

Objective

The objective of the study was to identify baseline factors predicting NC decline over the subsequent 3 years in HIV+ aviremic individuals

Methods

- Secondary analysis of the CHARTER longitudinal neuropsychological data
  - 15 neuropsychological (NP) tests administered every 6 months
- **STEP 1: Group-based trajectory analysis** was used to detect patterns of change on each NP test over the course of follow-up in the entire longitudinal cohort (n = 701) (see Figure 1 for illustration)
  - Deterioration ≥ 0.5 SD on at least 1 test within the first 36 months of follow-up is considered decline
- **STEP 2: Multiple logistic regression** was used to identify baseline socio-demographic, clinical, biological and lifestyle factors associated with decline among those who were aviremic at all time points during the first 3 years.
  - Covariates were retained in the final model if the lower-bound of the 95% CI was above 0.9

Results

STEP 1: Group-Based Trajectory Analysis in the longitudinal cohort (n=701)

- Only 5/15 NP tests showed decline in ≥ 1% of participants (see Table 1)

Table 1: NP tests that showed decline in ≥ 1% of participants

Neuropsychological test	Decline (N, %)
Grooved Pegboard-Dominant	59 (8)
Trail Making Test-B	32 (5)
Wisconsin Card Sorting Test	17 (2)
Grooved Pegboard-Non-dominant	16 (2)
HVLT Total Learning	7 (1)

Tests that showed decline in 0-1% of the sample: TMT-A, Digit Symbol, Symbol Search, Letter and Category Fluency, PASAT, Letter Number Sequencing, HVLT Recall, BVMT Learning and Recall

STEP 2: Predictors of decline among aviremic participants

- 191/701 were aviremic at all time points in the first 3 years
- 23/191 (12%) declined cognitively over 3 years; most declined on 1 NP test only
- In the multivariate analysis, the factors at baseline that predicted NC decline are listed in Table 2.

Table 2: Factors predicting NC decline over 36 months in Aviremic HIV+ individuals in CHARTER

Risk Factor [Reference level]	Odds Ratio	95% Confidence interval
eGFR ≤ 50 mL/min [> 50]	6.80	1.35, 34.23
HIV infection ≥ 15 years [0-<5]	5.45	1.19, 25.02
Education ≤ 12 years [> 12]	4.25	1.45, 12.42
CSF protein >45 mg/dL [≤45]	3.25	1.13, 9.35

- History of cerebrovascular disease was predictive in univariate analysis only

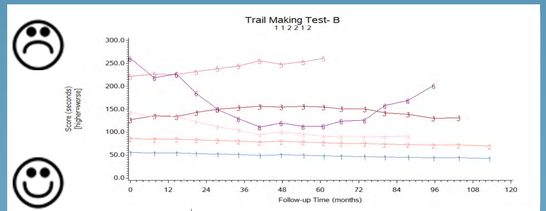
Conclusions

- Cognitive decline over 3 years was uncommon in this sample of aviremic HIV+ individuals.
- The strongest predictor of decline was eGFR, a known independent predictor of atherosclerotic vascular disease.
- This work suggests that **controlling additional cardio-vascular risk factors** could be a useful strategy for minimizing cognitive decline.
  - Such modifiable risk factors were very common in the entire cohort, with as many as 80% reporting either smoking or a BMI ≥ 25.

Smoking cessation and avoidance of obesity would be obvious starting points to maintain brain health.

- Several factors associated with impairment or decline in prior studies did not predict decline in this sample: older age, current and nadir CD4, CPE score, hepatitis C co-infection, diabetes, hypertension or a diagnosis of AIDS

Figure 1: Group-Based Trajectory Analysis (illustration)



Classification	Trajectory [%assigned]
Stable	1 [46.1%], 2 [34.7%], 5 [2.7%]
Improved	4 [9.8%], 6 [2.1%]
Declined	4 [4.6%]

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neuro
CHARTER
the CTN CIHR Canadian HIV Trials Network
le Réseau Réseau canadien pour les essais VIH des IRSC
CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada