Heterogeneity of disengagement from antiretroviral care matters for treatment success

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BACKGROUND

- Demographic and clinical characteristics identify people at higher risk of disengagement. However, most people out of care are considered 'low risk'. Therefore, these characteristics miss most who disengage from antiretroviral therapy (ART).
- Patterns of observed engagement behaviour over time may identify more meaningful segments of the population on ART, which could be used to target service delivery.

METHODS

- Routine health data was obtained from the Western Cape Provincial Health Data Centre, South Africa. The cohort included individuals:
  - Aged ≥15 years
  - Who initiated ART under treat-all guidelines (≥1st September 2016)
  - And sought care in Khayelitsha or Gugulethu (low-resource, high-HIV-burden settings)
- Group-based trajectory-modelling is a form of latent class analysis using observed data to segment populations into discrete subgroups. We identified subgroups with distinct longitudinal engagement patterns over 1 and 5 years after ART initiation.
- Subgroup associations with both treatment success and individual characteristics were assessed with logistic regression.

Measuring engagement

Engagement was measured as a binary variable (in care/ out of care) each month after ART initiation.

Disengagement: individuals were considered disengaged if they had a treatment interruption >90 days (between recorded and expected visits, based on previous ART refill duration) *OR* were lost to follow-up (no visit within 180 days of database closure on 30th September 2022). Interruptions started on the expected visit date.

Re-engagement: individuals were considered re-engaged on the date they received an ART refill after an interruption.

Treatment success

Viral suppression: viral load ≤1000 copies/mL at 5 years (window 12 months, missing result considered unsuppressed).

Engagement is not binary: it is heterogenous and dynamic

RESULTS

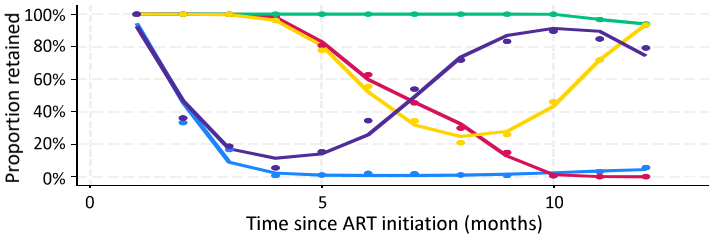
Cohort: 68,888 individuals

Age at initiation: 26 — **31** — 38 years (median, IQR)

Proportion female: 71%

Patterns of engagement over 1 year from initiating ART

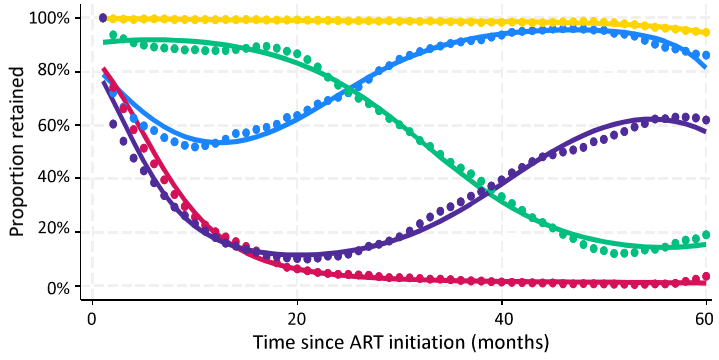
in 68,063 individuals with ≥1 year of follow-up



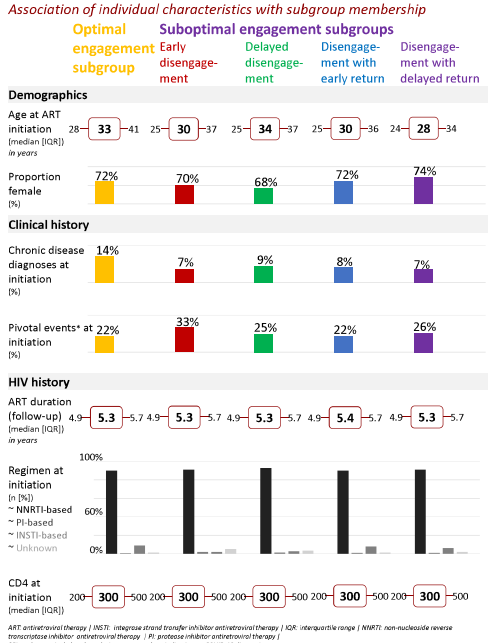
Subgroup name	Prevalence (n [%])
Optimal retention	39,859 [58.56%]
Early drop out	12,170 [17.88%]
Delayed drop out	10,447 [15.34%]
Early drop out and return	3430 [5.39%]
Delayed drop out and return	2157 [3.17%]

Patterns of engagement over 5 years from initiating ART

in 26,422 individuals with ≥5 years of follow-up



Association of individual characteristics with subgroup membership



ART: antiretroviral therapy | INSTI: integrase strand transfer inhibitor antiretroviral therapy | IQR: interquartile range | NNRTI: non-nucleoside reverse transcriptase inhibitor antiretroviral therapy | PI: protease inhibitor antiretroviral therapy |
*Pivotal events include tuberculosis, pregnancy, hospitalisation, or COVID-19 diagnosis

Model description		Treatment success at 5 years	
Subgroup name	**Subgroup prevalence** N [%]	**Viral suppression** N [%]	**Odds of suppression** adjOR [95% CI]
Optimal engagement	9984 [37.79%]	5834 [58%]	Ref
Early disengagement	6693 [25.33%]	359 [5%]	0.05 [0.04-0.06]
Delayed disengagement	3882 [14.69%]	559 [14%]	0.15 [0.13-0.17]
Disengagement with early return	3092 [11.70%]	1485 [48%]	0.64 [0.56-0.73]
Disengagement with delayed return	2771 [10.49%]	866 [31%]	0.33 [0.29-0.39]

adjOR: adjusted odds ratio | CI: confidence interval | N: number

CONCLUSIONS

- Disengagement was common: most (62%) interrupted treatment at least once over 5 years from initiation.
- However, engagement was not binary: people disengaged in various ways and patterns varied over time.
- Patterns of disengagement behaviour were:
  - Similar over 1 and 5 years after initiation
  - Similar to patterns in other settings
  - More predictive of viral suppression than demographic or clinical factors.
- No variables were strongly predictive of subgroup membership.
- Classifying these patterns of engagement applies precision public health principles to identify population segments that likely have unique care needs.
- Further exploration of lived experiences behind each pattern could help identify what each subgroup needs to support sustained engagement, and inform development of person-centred services targeted at patients with similar behaviour and experiences.

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