Regular engagement in medical care is important for people living with HIV (PLWH) and their communities.

- Inconsistent care is associated with increased risks of viral rebound, treatment failure, and death.
- Regular care is associated with greater access and adherence to antiretroviral therapy (ART) and higher rates of viral suppression.

Standard measures of retention in HIV care are all-or-nothing classifications: a person is either "in care" or "out of care". These measures ignore the evolving process of engagement in care, where patients experience periods of more or less frequent care encounters.

For each patient, we constructed a care trajectory, \( t_i \), based on the timing of past care events during the 2008-2015 study period:
- Defined care events as clinic visits with prescribing providers or HIV-related laboratory test results (CD4 count or viral load).
- Constructed care trajectories in six-month intervals from a patient’s first observed care event until death, transfer/relocation, or end of 2015.
- Recorded whether a patient had at least one care event in each interval.
- Patients with <1 year of observation time were excluded from analysis.

Study population:
- ≥18 years-old seen at least once from 2008-2013 at the Positive Care Center at the Hennepin County Medical Center (largest HIV provider in MN).
- 73% male; 46% black, 38% white; average trajectory length of 5.8 years

Data sources:
- Dates of clinic visits and HIV-related laboratory tests from 2008-2015 extracted from electronic medical records.
- Minnesota Department of Health HIV surveillance data to account for death, transfers to other providers, and relocation out of state.

Methods

Sample trajectories:

\[
\begin{align*}
\text{Class 1:} & \quad 11110111111101 \\
\text{Class 2:} & \quad 1101100000110111 \\
\text{Class 3:} & \quad 1111010111100000 \\
\text{Class 4:} & \quad 1011101111110000 \\
\text{Class 5:} & \quad 0000000000000000
\end{align*}
\]

We used latent class analysis (poLCA R package) to assign the study population into \( K \) care classes such that the following likelihood function was maximized:

\[
\sum_{c=1}^{K} \prod_{i=1}^{N} p(t_i | \theta, c) p_c(c)
\]

where \( p_c(c) \) is the probability that patient \( i \) belongs to class \( c \) and \( p(t_i | \theta, c) \) is the probability of observing trajectory \( t_i \) given membership in class \( c \). The number of classes, \( K \), was selected to balance model fit with model complexity.

We identified five intuitive care trajectories, including four distinct patterns of sub-optimal retention with differing viral suppression.

Results

A total of 2,110 patients were included in the analysis.

- 73% male; 46% black, 38% white; average trajectory length of 5.8 years

Study population was best divided into 5 care classes:

- Class 1: "Consistent care"
- Class 2: "Less frequent care"
- Class 3: "Return to care after initial attrition"
- Class 4: "Moderate attrition"
- Class 5: "Rapid attrition"

Patient outcomes: - death by end of 2015 - sustained viral suppression (all viral loads <50 copies/mL in last 12 months) - standard retention in care measure (care event in every six-month interval)

Conclusions:

We identified five intuitive care trajectories, including four distinct patterns of sub-optimal retention with differing viral suppression.