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Frequency and Duration of Churn Among People Living with HIV in Washington, DC

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INTRODUCTION

- Measuring retention in care is an essential component of the HIV care continuum
- In addition, with the new emphasis on 'treatment as prevention,' it is imperative that people living with HIV (PLWH) receive continuous treatment in order to maintain a suppressed viral load
- Traditional retention measures often fail to adequately capture the care dynamics of those who cycle in and out of care
- It is unclear whether this cycling, or "churn," results in poorer clinical outcomes

OBJECTIVES

- To characterize the frequency of churn and duration of gaps in care among PLWH
- To identify individual characteristics and clinical outcomes associated with varying churn patterns

METHODS

- Data were restricted to those individuals who resided in DC at time of diagnosis
  - Diagnosed prior to 2008
  - Had at least one visit in 2008
  - Living as of Dec. 31st, 2013
  - Received care in 2013 (i.e. had at least one lab visit in 2013)
- Primary outcome of interest: The number of times a person was out of care for 27 weeks (6 months) or longer prior to returning to care, i.e. level of churn
- All labs from an individual's last visit in 2008 through their last visit in 2013 were included in churn calculations
- Frequencies, univariate, bivariate, and nonparametric analyses, as well as multivariate logistic regression were conducted to assess associations between individual characteristics and HIV clinical outcomes, and churn

RESULTS

- Among 3,364 PLWH, 91% (n=3,064) had evidence of churn
- Among the 3,064 individuals who churned, 26% had one gap, 28% two gaps, 22% three gaps, and 25% had 4-7 gaps in care between 2008 and 2013
- In univariate analyses, level of churn varied significantly by sex (p=0.04), race/ethnicity (p<0.01), age (p<0.01), and duration of HIV infection (p=0.01) (Table 1)
- There was no association between HIV/AIDS stage at 2008 lab and churn level (Data not shown)
- CD4 count increased significantly between 2008 to 2013 across all churn categories (Kruskal Wallis p-values < 0.0001 for all levels) (Figure 1)
  - There were no significant differences in the increase in CD4 count when comparing churn levels (p=0.78)
- Viral load decreased significantly between 2008 and 2013 across all churn categories (Kruskal Wallis p-values < 0.0001 for all levels) (Figure 2)
  - There were no significant difference in the decrease in viral load when comparing churn levels (p=0.99)

RESULTS (CONT.)

- Multivariate logistic regression found that, compared to persons with no churn (Table 2):
  - Those under 35 years of age were significantly more likely to experience two or more gaps in care than those who were 45-64 years
  - Blacks were also significantly more likely to have one or two gaps in care than whites
  - Persons diagnosed with HIV ≤1 year prior to their 2008 visit were significantly more likely to churn compared to those diagnosed more than 15 years prior
- The mean duration of churn was inversely related to the number of gaps: persons with one gap in care had a mean gap of 63 weeks compared to 36 weeks among persons with seven gaps in care (Figure 3)

Figure 1. CD4 count for 2008 and 2013 labs by churn level, with percent increases (n=2,252)

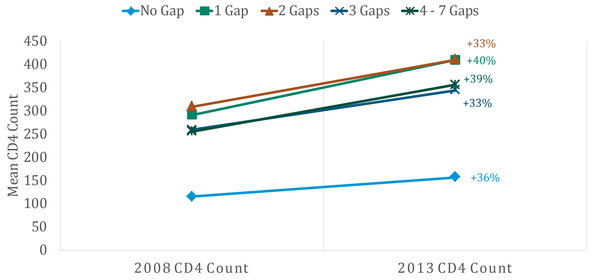


Figure 2. Viral load for 2008 and 2013 labs by churn level with percent decreases (n=3,264)

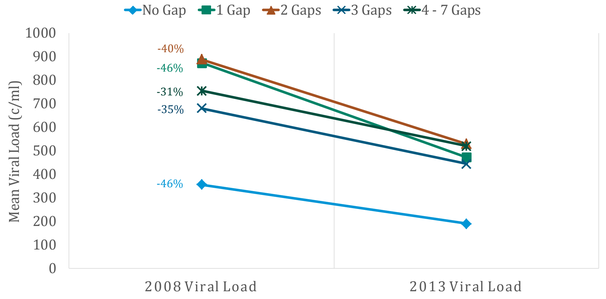


Table 1. Demographic frequencies by level of churn, n=3,364

	Overall n (%)	No Churn n (%)	Any Churn n (%)	Chi-Square P-value*
Sex				**0.0407**
Male	2,277 (67.69)	212 (70.67)	2,065 (67.40)	
Female	1,087 (32.31)	88 (29.33)	999 (32.60)	
Race/Ethnicity				**0.0039**
White, non-Hispanic	556 (16.53)	69 (23.00)	487 (15.89)	
Black, non-Hispanic	2,571 (76.43)	204 (68.00)	2,367 (77.25)	
Other or Unknown	237 (7.05)	27 (9.00)	210 (6.85)	
Age as of December 31st, 2008				**0.0023**
Under 35	576 (17.12)	30 (10.00)	546 (17.82)	
35-44	1,007 (29.93)	87 (29.00)	920 (30.03)	
45-54	1,244 (36.98)	128 (42.67)	1,116 (36.42)	
55-64	456 (13.56)	48 (16.00)	408 (13.32)	
65 and over	81 (2.41)	7 (2.33)	74 (2.42)	
Duration of HIV Infection Prior to 2008 Lab (years)				**0.0107**
More than 15	420 (12.49)	54 (18.00)	366 (11.95)	
11 - 15	635 (18.88)	62 (20.67)	573 (18.70)	
6 - 10	1,037 (30.83)	87 (29.00)	950 (31.01)	
1 - 5	1,129 (33.56)	96 (32.00)	1,033 (33.71)	
1 or less	143 (4.25)	1 (0.33)	142 (4.63)	
Mode of Transmission				**0.2152**
Men who have sex with men (MSM)	1,295 (38.5)	132 (44.00)	1,163 (37.96)	
Injection drug use (IDU)	636 (18.91)	62 (20.67)	574 (18.73)	
MSM/IDU	146 (4.34)	14 (4.67)	132 (4.31)	
Heterosexual Contact	1,005 (29.88)	73 (24.33)	932 (30.42)	
Other or unknown	282 (8.38)	19 (6.33)	263 (8.58)	

*P-value calculated based on churn categories: no churn, 1 gap, 2 gaps, 3 gaps, and 4-7 gaps

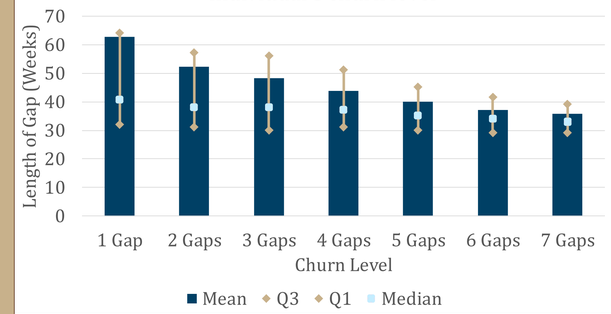
Table 2. Adjusted odds ratios (OR)* and corresponding 95% confidence intervals (95% CI) for variables of interest with churn levels (reference = no churn), n=3,364

	1 Gap aOR (95% CI)	2 Gaps aOR (95% CI)	3 Gaps aOR (95% CI)	4 - 7 Gaps aOR (95% CI)
Sex				
Male	Ref.	Ref.	Ref.	Ref.
Female	0.83 (0.56, 1.23)	0.95 (0.64, 1.40)	0.72 (0.48, 1.08)	0.77 (0.52, 1.14)
Race/Ethnicity				
White, non-Hispanic	Ref.	Ref.	Ref.	Ref.
Black, non-Hispanic	**1.61 (1.09, 2.36)**	**1.63 (1.11, 2.41)**	1.43 (0.96, 2.12)	1.32 (0.89, 1.94)
Other or Unknown	1.35 (0.78, 2.34)	1.07 (0.61, 1.89)	0.82 (0.46, 1.48)	0.69 (0.39, 1.24)
Age as of December 31st, 2008				
Under 35	Ref.	Ref.	Ref.	Ref.
35-44	0.81 (0.50, 1.30)	0.65 (0.41, 1.05)	**0.53 (0.33, 0.86)**	0.65 (0.40, 1.04)
45-54	0.67 (0.42, 1.08)	**0.53 (0.33, 0.84)**	**0.46 (0.28, 0.73)**	**0.50 (0.31, 0.80)**
55-64	0.69 (0.40, 1.21)	**0.57 (0.33, 0.98)**	**0.46 (0.26, 0.80)**	**0.42 (0.24, 0.74)**
65 and over	1.32 (0.52, 3.37)	0.73 (0.28, 1.90)	0.43 (0.15, 1.20)	0.37 (0.13, 1.06)
Duration of HIV Infection Prior to 2008 Lab (years)				
More than 15	Ref.	Ref.	Ref.	Ref.
11 - 15	1.46 (0.93, 2.30)	1.02 (0.65, 1.60)	1.14 (0.72, 1.82)	1.23 (0.77, 1.95)
6 - 10	1.41 (0.92, 2.16)	1.27 (0.84, 1.94)	1.26 (0.81, 1.94)	1.53 (0.99, 2.36)
1 - 5	1.36 (0.89, 2.09)	1.23 (0.81, 1.88)	1.23 (0.80, 1.91)	1.25 (0.81, 1.93)
1 or less	**15.50 (2.05, 117.31)**	**16.89 (2.26, 126.52)**	**15.97 (2.11, 120.80)**	**15.92 (2.11, 120.33)**
Mode of Transmission				
Men who have sex with men (MSM)	Ref.	Ref.	Ref.	Ref.
Injection drug use (IDU)	0.88 (0.57, 1.37)	0.99 (0.64, 1.54)	1.10 (0.70, 1.73)	1.14 (0.73, 1.78)
MSM/IDU	1.00 (0.51, 1.94)	0.92 (0.47, 1.80)	1.19 (0.61, 2.32)	0.82 (0.41, 1.65)
Heterosexual Contact	1.20 (0.76, 1.88)	1.31 (0.83, 2.05)	1.29 (0.81, 2.05)	1.55 (0.99, 2.45)
Other or unknown	1.13 (0.63, 2.03)	1.53 (0.87, 2.72)	1.47 (0.82, 2.64)	1.45 (0.81, 2.59)

Adjusted model likelihood ratio p-value = 0.0001

*Adjusted for sex, race, age, duration of HIV infection prior to 2008 lab, and mode of transmission

Figure 3. Length of gap in weeks by an individual's churn level



CONCLUSIONS

- Our findings reinforce that retention in care is not linear, as the vast majority of persons cycled in and out of care.
- Higher levels of churn were significantly associated with being black, younger, and more recent diagnosis.
- Regardless of churn level, participants' CD4 counts and viral loads improved over time; however these findings may be due to improved access to HIV care and treatment in general, especially considering CD4 count and viral load were only measured at two points in time.
- Although the analyses were restricted to individuals who resided in DC in 2008 and 2013, it is possible that they could have moved out of and then back into DC between those times, thus resulting in an apparent gap while still receiving care outside of DC's jurisdiction.
- These results add to our understanding of the impact of taking periodic breaks from care and help quantify the large amount of churn observed among PLWH; further analysis is being conducted to determine the strongest definition for churn.
- Additional research to identify other factors that may affect churn (e.g., mental health, substance abuse, insurance, and housing) will assist in furthering our understanding of barriers to sustained retention in care.

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