



# Gaps in care and viral load: Findings from the CDC Studies REPC and APTcare

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## **Disclaimer**

The opinions and assertions contained herein are those of the authors alone and do not represent the opinion or policy of the Centers for Disease Control and Prevention or the U.S. Government

## **Conflicts of Interest**

I have no conflicts of interest to declare



## **Gaps in Care: When to Intervene and on Whom**

*Despite your best efforts, you will lose touch with patients who have failed to return as scheduled*

**Giordano T (2005) Patients referred to an urban HIV clinic frequently fail to establish care: factors predicting failure**

**Mugavero M (2009) Missed visits and mortality among patients establishing initial outpatient HIV treatment**



## Research questions:

- a. **Do patient's viral loads (VL) change over a Gap in care of more than 6 months?**
  
- b. **Within the subset of patients with a suppressed VL at gap opening, does the percent failing to maintain suppression change with longer gap duration?**

Design: Two of CDC's HIV Cohorts

- Retention through Enhanced Personal Contact (REPC), a trial of 2 enhanced contact arms and a SOC arm, 2010-2013, N=1,838.
- Adherence and Prevention of Transmission through Care (APTcare) cohort (Birmingham, Miami, San Diego, Seattle, Boston and Houston) 2013-2015, N=16,609.



# Measures

## *Outcomes*

- change in log<sub>10</sub> VL
- percentage of patients not maintaining initially suppressed VL during a gap in care

## *Gap duration (months)*

6 to <7; 7 to <8; 8 to <9; 9 to <12; 12 or more

## *Correlates*

- Age; race/ethnicity; recency of diagnosis  
OR new vs. established pt; type of health insurance or assistance



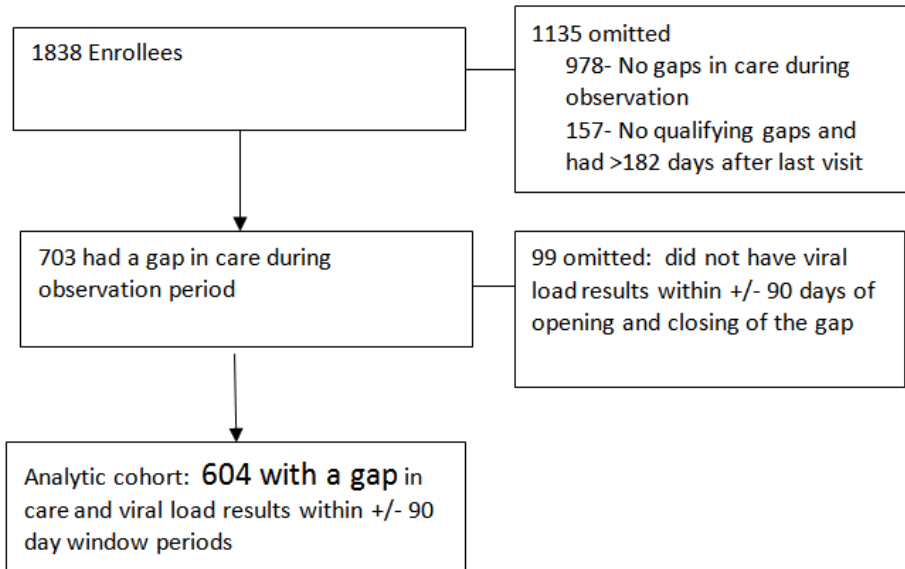
## Statistical Analysis

- Paired t-test for before- and after-gap on  $\log_{10}$  VL
- Linear model-adjusted risk ratios using robust Poisson risk estimates with a sandwich variance estimate.
- Two-tailed p-values and 95% C.I.



Figure 1. Flow Diagram for selecting analytic cohort

### REPC Trial



### APTcare project

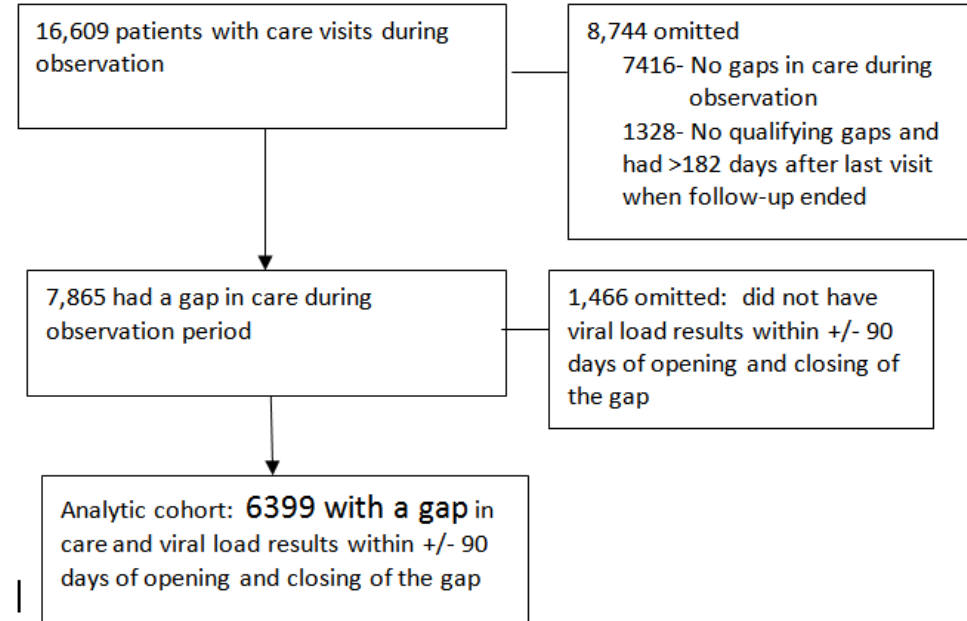


Table 1. Mean log<sub>10</sub> VL at beginning, end of gap, and paired t-test of the mean difference

Duration of gap in care (months)	No. of pts	Mean log <sub>10</sub> viral load at beginning of the gap (SEM)	Mean log <sub>10</sub> viral load at end of the gap (SEM)	Mean diff between beginning and end log <sub>10</sub> viral load (SEM)	Paired t-test of change in mean log <sub>10</sub> viral load within gap categories
<b>REPC trial (N=604)</b>					
6 to <7	190	2.23 (0.079)	2.33 (0.095)	+0.10 (0.072)	1.37, p = 0.17
7 to <8	115	2.29 (0.112)	2.34 (0.125)	+0.05 (0.092)	0.57, p = 0.57
8 to <9	72	2.42 (0.148)	2.60 (0.171)	+0.18 (0.145)	1.23, p = 0.22
9 to <12	127	2.46 (0.107)	2.60 (0.131)	+0.14 (0.102)	1.42, p = 0.16
12 or more	100	2.57 (0.128)	3.20 (0.154)	+0.63 (0.143)	4.40, p < 0.001
<b>APTcare project (N=6399)</b>					
>6 to <7	2084	1.71 (0.019)	1.69 (0.019)	-0.02 (0.017)	-1.01, p = 0.31
7 to <8	1173	1.78 (0.028)	1.81 (0.030)	+0.03 (0.028)	1.22, p = 0.22
8 to <9	833	1.94 (0.039)	1.99 (0.042)	+0.05 (0.037)	1.34, p = 0.18
9 to <12	1242	1.99 (0.033)	2.14 (0.038)	+0.15 (0.031)	4.70, p < 0.001
12 or more	1067	2.17 (0.040)	2.41 (0.044)	+0.24 (0.043)	5.60, p < 0.001



Table 2. Percentages and RRs of Patients not maintaining a supp VL after a gap in care

Analytic samples and subgroups	Percent (n) not maintaining supp VL at end of gap	Model-adjusted risk ratios (95% CI)
<b>REPC trial (N = 416 patients with suppressed viral load at beginning of gap)</b>		
<b>Duration of visit gap</b>		
>6 to <7 N=138	14.5 (20)	Referent
7 to <8 N=84	13.1 (11)	0.94 (0.48, 1.86)
8 to <9 N=48	25.0 (12)	1.59 (0.84, 3.00)
9 to <12 N=83	19.3 (16)	1.35 (0.73, 2.48)
12 or more N=63	44.4 (28)	3.00 (1.82, 4.93)**
<b>Age (yrs)</b>		
18 to 39 N=138	24.6 (34)	1.42 (0.89, 2.28)
40 to 49 N=155	18.7 (29)	1.09 (0.68, 1.75)
50-plus N=123	19.5 (24)	Referent
<b>Race/ethnicity</b>		
N-H black N=285	24.2 (69)	1.81 (0.98, 3.73)
Hispanic N=53	13.2 (7)	1.01 (0.42, 2.45)
Other <sup>a</sup> N=10	20.0 (2)	1.79 (0.42, 7.63)
White N=68	13.2 (9)	Referent
<b>Health insurance</b>		
Not private <sup>b</sup> N=351	22.8 (80)	1.85 (0.92, 3.73)
Private N=65	10.8 (7)	Referent

Table 2. Percentages and RRs of Patients not maintaining a supp VL after a gap in care

Analytic samples and subgroups	Percent (n) not maintaining supp VL at end of gap	Model-adjusted risk ratios (95% CI)
<b>APTcare project (N = 5242 patients with suppressed viral load at beginning of gap)</b>		
Duration of visit gap		
>6 to <7 N=1832	5.4 (98)	Referent
7 to <8 N=1003	9.6 (96)	1.74 (1.33, 2.29)**
8 to <9 N=667	10.3 (69)	1.88 (1.40, 2.51)**
9 to <12 N=969	14.3 (139)	2.52 (1.97, 3.21)**
12 or more N=771	23.2 (179)	3.97 (3.14, 5.01)**
Age (yrs)		
18 to 39 N=1369	14.2 (194)	1.56 (1.28, 1.90)**
40 to 49 N=1671	11.6 (194)	1.30 (1.08, 1.56)*
50 and older N=2202	8.8 (193)	Referent
Health insurance		
Not private <sup>b</sup> N=3783	13.0 (491)	1.91 (1.51, 2.41)**
Missing data <sup>c</sup> N=206	5.3 (11)	0.90 (0.49, 1.66)
Private N=1253	6.3 (79)	Referent
Sex/orientation		
Women N=1283	13.5 (173)	1.03 (0.85, 1.25)
MSM N=2603	9.1 (237)	0.80 (0.67, 0.97)*
Hetero men N=1356	12.6 (171)	Referent
Race/ethnicity		
N-H black N=2161	13.5 (292)	1.22 (1.01, 1.48)*
Hispanic N=1101	10.9 (120)	0.97 (0.77, 1.23)
Other <sup>a</sup> N=184	7.1 (13)	0.76 (0.44, 1.30)
white N=1796	8.7 (156)	Referent
Months since HIV diagnosis <sup>d</sup>		
1 to 24 mos N=406	13.6 (55)	Referent
25 to 72 mos N=1053	10.3 (108)	0.78 (0.58, 1.04)
>72 months N=3539	11.3 (398)	0.97 (0.75, 1.26)
Missing data <sup>c</sup> N=244	8.2 (20)	0.68 (0.42, 1.10)



# Summary

- **Non-significant within-person changes in VL seen for gaps >6 but <9 mos long**
- **APTcare had significant within-person changes in VL for gaps 9 to <12 months.**
- **Both APTcare and REPC showed sig. within-person changes for gaps 12+ months**
  
- **Similar pattern results for subset of pts with a suppressed VL at opening of the gap**
- **Strongest effect in the 12+ months group: 44% unsuppressed in REPC, 23% in APTcare**
  
- **Younger patients, black patients, and those with non-private sources of health insurance were less likely to maintain a suppressed viral load than their referents**



# Comment

- Part of the non-adherence in the longer gaps may be from lack of ART prescriptions
- Ability to refill ART prescriptions beyond 90 days may be a major factor in holding down the risk of not maintaining supp VL to the low levels we observed in the clinic-wide APTcare cohort.
- We did not include patients with “terminal” (uncompleted) gaps. Some of these patients may have moved and remained in care, others may have disengaged.
- Re-engagement implications
  - With resource constraints, patients out of care 9 or more months should be prioritized
  - Yet patients out of care that long may be harder to locate
  - With no resource constraints, patients with all gap lengths could receive equal attention



Six HIV clinics affiliated with the following institutions conducted the Adherence and Prevention of Transmission through Care (APTcare) project:

- Baylor College of Medicine (BCM), Houston, TX
- Boston Medical Center (BMC), Boston, MA
- University of Alabama (UAB), Birmingham, AL
- University of California (UCSD), San Diego, CA
- University of Miami Medical School (UM), Miami, FL
- University of Washington (UW), Seattle, WA

Six HIV clinics affiliated with the following institutions conducted the Retention through Enhanced Personal Contact (REPC) trial:

- Baylor College of Medicine (BCM), Houston, TX
- Boston Medical Center (BMC), Boston, MA
- University of Alabama (UAB), Birmingham, AL
- University of Miami Medical School (UM), Miami, FL
- State University of New York, (SUNY)Downstate Medical Center, Brooklyn, NY
- Johns Hopkins University School of Medicine, (JHU) Baltimore, MD

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