# Are Missed- and Kept-Visits-Based Measures Capturing Different Aspects of Retention in Care?

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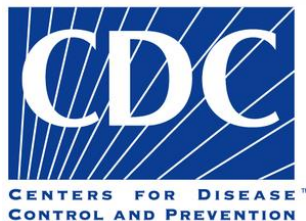
NATIONAL HIV/AIDS STRATEGY

Federal Implementation Plan

JULY 2010

Monitoring HIV Care in the United States

Indicators and Data Systems

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A number of obstacles prevent people with HIV from experiencing optimal health, including late diagnosis, delayed access to care, breaks in care, delayed prescription and intermittent use of life-saving antiretroviral therapy, untreated mental health and substance use disorders, and unmet basic needs.

MONITORING HIV CARE
IN THE **UNITED STATES**
INDICATORS AND DATA SYSTEMS

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http://www.iom.edu/Reports/2012/Monitoring-HIV-Care-in-the-United-States.aspx
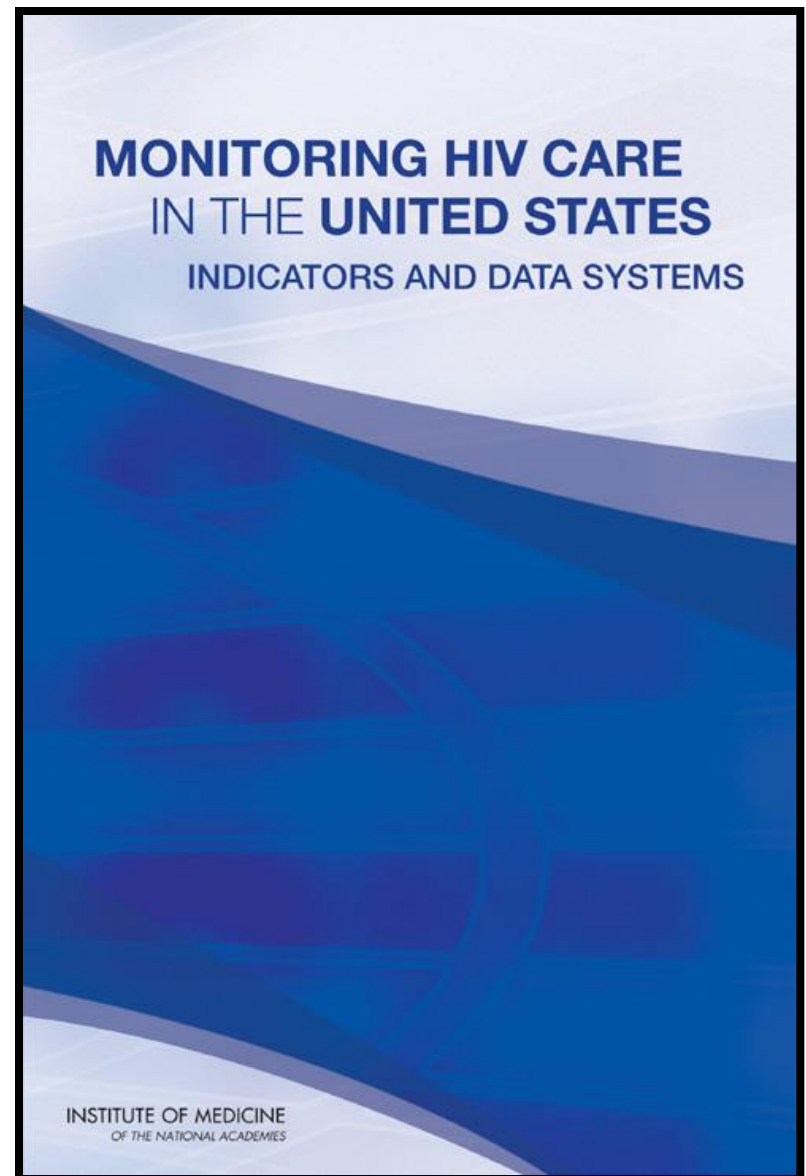
- Measuring retention in care is complex
  - Multiple visits at varying intervals over time

- Numerous retention measures employed
  - Missed visit ("no show") & kept visit measures
  - Each associated w/ biological & clinical outcomes

- Degree to which measures are related to one another is largely unexplored

Measure	Description
Missed visits: count	Number of "no show" visits accrued (count measure)
Missed visits: dichotomous	≥1 "no show" visit (dichotomous measure, 'no' = retained)
Visit adherence	Proportion of kept visits / (kept + "no-show" visits) (continuous measure, range=0.0-1.0)
4-month constancy	Number of 4-month intervals with at least 1 kept visit (categorical measure, range=0-3)
6-month gap	≥189 days elapsed between sequential kept visits (dichotomous measure, 'no' = retained)
HRSA HAB	2 kept visits separated by ≥90 days (dichotomous measure, 'yes' = retained)

Spearman rank correlation matrix

	Missed visits (count)	Missed visits (dichotomous)	Visit adherence	4-month constancy	6-month gap	HRSA HAB measure
Missed visits (count, range=1-14)	1					
Missed visits (dichotomous)	0.84	1				
Visit adherence (continuous, range=0.0-1.0)	0.85	0.83	1			
4-month constancy (categorical, range=0-3)	0.21	0.26	0.57	1		
6-month gap (dichotomous)	0.20	0.25	0.51	0.76	1	
HRSA HAB measure (dichotomous)	0.16	0.22	0.53	0.77	0.72	1

Association of retention measures with 12-month VL suppression (<400 c/mL)

	Odds Ratio [a]	95%CI	C-statistic	Sn [b]	Sp [b]
Missed visits (count)	0.73	0.71-0.75	0.67	68.4%	55.9%
Missed visits (dichotomous)	3.16	2.79-3.59	0.62	41.9%	81.5%
Visit adherence	3.87	3.49-4.29	0.69	68.1%	61.4%
4-month visit constancy	2.77	2.52-3.05	0.63	64.6%	57.9%
6-month gap	2.96	2.65-3.31	0.61	82.0%	39.4%
HRSA HAB measure	3.81	3.33-4.35	0.59	91.2%	26.8%

[a] OR presented per missed visit (count), per 0.5 increase for visit adherence & 4-month constancy, and "retained" for dichotomous retention measures: missed visits, 6-month gap, and HRSA HAB measure

[b] Sn and Sp for cut-points for "retained" of: ≤ 1 missed visits (count), ≥ 70% visit adherence, and attended visits in all 3 intervals for 4-month constancy, and per "retained" for dichotomous measures

Mugavero, et al., *JAIDS* 2012; 61

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Methods

- <u>Study aims</u>:
  - Evaluate differences in association of social demographics among 6 retention measures

- <u>Design</u>:
  - Retention in Care (RIC) Intervention Study
    - Six academically-affiliated HIV clinics
    - Phase I (Clinic-wide) & Phase II (Behavioral RCT)
  - Current study: Clinic-wide cohort design during 12 months preceding Phase I RIC intervention
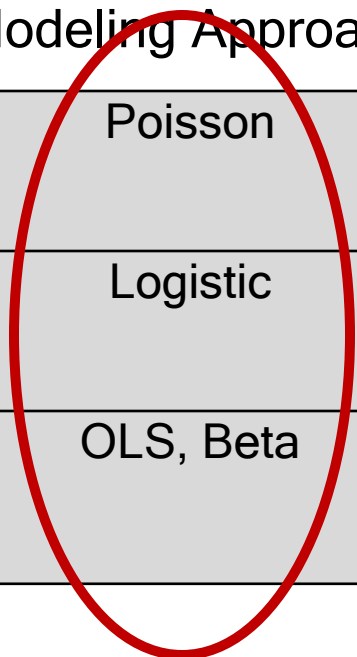
Methods

- Study period: May 2008 – April 2009

- Eligibility criteria:
  - Attended ≥1 primary HIV care appointment in the year preceding study period
  - ≥1 scheduled primary HIV care appointment during 1st six months of study period
  - Criteria employed to identify established clinic patients in whom retention could be measured

Methods

- Principal outcome:
  - Six commonly used retention measures
    - Scheduled visits w/ primary HIV medical provider
    - Calculated based upon kept and no show visits

- Principal exposures:
  - Social demographics

- Statistical analyses:
  - Multivariable regression for each measure

Methods: Retention Measures

Measure	Description	Modeling Approach
Missed visits: count	Number of "no show" visits accrued (count measure)	Poisson
Missed visits: dichotomous	≥1 "no show" visit (dichotomous measure, 'no' = retained)	Logistic
Visit adherence	Proportion of kept visits / (kept + "no-show" visits) (continuous measure, range=0.0-1.0)	OLS, Beta

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4-month constancy	Number of 4-month intervals with at least 1 kept visit (categorical measure, range=0-3)	Ordinal logistic, multinomial logistic, OLS
6-month gap	≥189 days elapsed between sequential kept visits (dichotomous measure, 'no' = retained)	Logistic
HRSA HAB	2 kept visits separated by ≥90 days (dichotomous measure, 'yes' = retained)	Logistic

Baseline characteristics (n=10,053)

Age (years)	46.0 ± 10.0
Gender	
Male	6549 (65.1%)
Female	3465 (34.5%)
Transgender	39 (0.4%)
Race	
Black	6435 (64.0%)
White	3004 (29.9%)
Other/Unknown	614 (6.1%)
Ethnicity	
Hispanic	1880 (18.7%)
Non-Hispanic	8066 (80.2%)
Missing/Unknown	107 (1.1%)
Risk transmission group	
MSM	2837 (28.2%)
MSM + IDU	230 (2.3%)
IDU	1318 (13.1%)
Heterosexual	4947 (49.2%)
Other/Missing/Unknown	721 (7.2%)

Baseline characteristics (n=10,053)

Site	
Baylor College of Medicine	2904 (28.9%)
Boston University Medical Center	1053 (10.5%)
Johns Hopkins University	1883 (18.7%)
SUNY Downstate Medical Center	922 (9.2%)
University of Alabama at Birmingham	1307 (13.0%)
University of Miami	1984 (19.7%)
Baseline plasma HIV RNA ($\log_{10}$ c/mL)	2.59 ± 1.17
Baseline CD4+ T lymphocyte count (cells/μL)	456 ± 296

Data presented as mean $\pm$ standard deviation or n (%)

"No show" visits (range=0-14)	1.5 ± 1.7
Zero	3327 (33.1%)
One	2895 (28.8%)
Two	1730 (17.2%)
≥ Three	2101 (20.9%)
Visit adherence	0.69 ± 0.30
0-24%	837 (8.4%)
25-50%	1103 (11.1%)
50-74%	2835 (28.4%)
75-99%	1951 (19.6%)
100%	3244 (32.5%)
4-month visit constancy (intervals with ≥ 1 kept visit)	
Zero	760 (7.6%)
One	1448 (14.4%)
Two	2768 (27.5%)
Three	5077 (50.5%)
6-month gap (≥ 189 days between sequential kept visits)	
No (Retained)	6805 (67.7%)
Yes (Not retained)	3248 (32.3%)
HRSA HAB measure (2 kept visits >90 days apart)	
Retained	7761 (77.2%)
Not retained	2292 (22.8%)
12-month plasma HIV RNA	
≤ 400 copies/mL	6304 (62.7%)
> 400 copies/mL	1931 (19.2%)
Missing	1818 (18.1%)

Data presented as mean ± standard deviation or n (%)

Disparities in Retention

	Missed visits	Appt. adherence
Male	**1.26** **(1.15, 1.37)**	**0.02** **(0.01, 0.03)**
Black/AA	**0.57** **(0.52, 0.62)**	**-0.06** **(-0.08, -0.05)**
IVDU	**0.68** **(0.60, 0.78)**	**-0.05** **(-0.06, -0.03)**

Data presented for "retained" for missed visit dichotomous (OR), visit adherence (β-coefficient), 4-month constancy (OR for ordinal regression), 6-month gap (OR), and HRSA HAB measure (OR)

Disparities in Retention **?**

	Missed visits	Appt. adherence	4-mo visit constancy	6-mo gap	HRSA HAB
Male	**1.26 (1.15, 1.37)**	**0.02 (0.01, 0.03)**	**0.90 (0.83, 0.97)**	0.94 (0.86,1.03)	0.92 (0.83,1.01)
Black/AA	**0.57 (0.52, 0.62)**	**-0.06 (-0.08, -0.05)**	1.01 (0.93,1.10)	0.97 (0.88-1.06)	0.98 (0.88-1.08)
IVDU	**0.68 (0.60, 0.78)**	**-0.05 (-0.06, -0.03)**	0.99 (0.88, 1.10)	1.03 (0.91, 1.17)	0.91 (0.79, 1.04)

Data presented for "retained" for missed visit dichotomous (OR), visit adherence (β-coefficient), 4-month constancy (OR for ordinal regression), 6-month gap (OR), and HRSA HAB measure (OR)

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Conclusions

- Considerable variability among six measures in categorizing "retention"

- Measures were differentially associated with gender, race, and HIV risk.
  - Associations were congruent within related measure groups (missed and kept)

Limitations

- Observational study: cannot ascribe causality

- Exclusion of patients new to care

- Relatively short observation period

Implications

- No gold standard for measuring 'retention'

- Interpretation of findings may vary dependent on chosen retention measure, even in identical samples

- Careful attention is warranted when comparing findings across study, data, and setting system with regards to measure(s) used

Acknowledgments

Boston University Medical Center
Mari-Lynn Drainoni (PI)
Cintia Ferreira
Lisa Koppelman
Maya McDoom
Michal Naisteter
Karina Osella
Glory Ruiz
Paul Skolnik
Meg Sullivan (PI)

SUNY Downstate Medical Center
Sophia Gibbs-Cohen
Elana Desrivieres
Mayange Frederick
Kevin Gravesande
Susan Holman
Harry Johnson
Tonya Taylor
Tracey Wilson (PI)

University of Alabama-Birmingham
Scott Batey
Stephanie Gaskin
Michael Mugavero (PI)
Jill Murphree
Jim Raper
Michael Saag (PI)
Suneetha Thogaripally
James Willig
Anne Zinski

Baylor College of Medicine
Monisha Arya
David Bartholomew
Tawanna Biggs
Hina Budhwani
Jessica Davila
Christine Jacobsen
Tom Giordano (PI)
Nancy Miertschin
Shapelle Payne
William Slaughter

Johns Hopkins University
Mollie Jenckes
Jeanne Keruly (PI)
Angie McCray
Mary McGann
Richard Moore (PI)
Melissa Otterbein
LiMing Zhou

University of Miami
Carolyn Garzon
Jesline Jean-Simon
Kathy Mercogliano
Lisa Metsch (PI)
Allan Rodriguez (PI)
Gilbert Saint-Jean
Marvin Shika

Mountain Plains AETC
Lucy Bradley-Springer
Marla Corwin

Federal
Laura Cheever, HRSA
Faye Malitz, HRSA
Robert Mills, HRSA
Jason Craw, CDC/ICF
Lytt Gardner, CDC
Sonali Girde, CDC/ICF
Gary Marks, CDC

We thank the study participants, providers, clinical and research personnel at the six study sites as well as the CDC and HRSA administrative and data management teams.