Nationally Representative Estimates of Self-reported Adherence to Antiretroviral Therapy in the United States—Medical Monitoring Project, 2009

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The findings and conclusions presented are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

Division of HIV/AIDS Prevention

Background

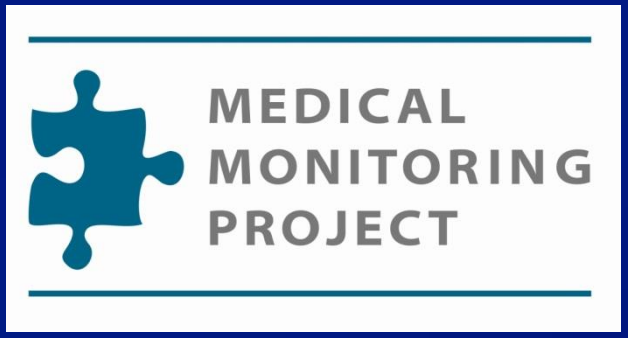
- **Adherence to antiretroviral therapy (ART) is critical for viral suppression**
- **Latest clinical guidelines recommend offering ART to all patients regardless of CD4**
  - Increase in the number of persons in need of adherence support
  - Adherence may be more challenging for those with no symptoms
- **No recent nationally representative U.S. estimates of ART adherence**
  - Provides important information on areas for intervention that may improve health outcomes at the population level

Analytic questions

- **What percentage of U.S. HIV-infected persons in care self-reported adherence to all ART doses during the past 72 hours?**
  - Is self-reported adherence associated with viral suppression?
  - What is the level of use of and need for adherence support services?
- **What factors are independently associated with adherence in this population?**

Methods

- **Analysis of Medical Monitoring Project (MMP) data collected June 2009 - May 2010**
  - **Ongoing supplemental HIV surveillance system**
  - **Interviews and medical record data from HIV-infected adults receiving care**
    - 16 U.S. states (including 6 separately funded areas) and one territory
  - **Three-stage sample design**
    - States
    - HIV care-providing facilities
    - HIV-infected adults receiving care
  - **Response rates for matched data**
    - States = 100%
    - Facilities = 76%
    - Patients = 51%
    - Overall = 39%



Methods

- **Persons included: MMP participants who reported current ART use and provided complete information about adherence to ART dosing (n = 3,606)**

- **Estimated the prevalence of self-reported 100% adherence to ART doses in the past 72 hours (ACTG)**
  - Are you currently taking [INSERT DRUG NAME]?
  - How many times did you miss taking a dose or a set of pills, spoonfuls, or injections of [INSERT DRUG NAME]?
    - Yesterday, the day before yesterday, three days ago
  - If you only took part of your dose, please report this as the whole dose missed.
  - Show medication card to aid recall

Version 4.0.0

Nucleoside/Nucleotide Analogue Reverse Transcriptase Inhibitors (NRTI)

Emtriva* (emtricitabine, FTC)

Epivir* (lamivudine, 3TC)

Retrovir* (zidovudine, AZT, ZDV)

Videx EC (didanosine, ddI)

Viread (tenofovir, TDF)*

Zerit* (stavudine, d4T)

Ziagen* (abacavir, ABC)

Protease Inhibitors (PI)

Aptivus (tipranavir, TPV)

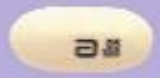
Crixivan (indinavir, IDV)

Invirase (saquinavir hard gel capsules, SQV)

Kaletra* (lopinavir/ritonavir, LPV/r)

Lexiva (fosamprenavir, FPV)

Norvir* (ritonavir, RTV)



Prezista (darunavir, DRV)

Reyataz (atazanavir, ATV)

Viracept (nelfinavir, NFV)

Fixed Dose Combinations

Atripla (TDF + FTC + EFV)

FDA Pregnancy Category D

Combivir (AZT plus 3TC)

Epzicom (ABC plus 3TC)

Trizivir (AZT plus 3TC plus abacavir)

Truvada (TDF plus FTC)

Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI)

Intelence (etravirine, ETV)

Rescriptor (delavirdine, DLV)

Sustiva* (efavirenz, EFV)

FDA Pregnancy Category D

Viramune* (nevirapine, NVP)

Entry Inhibitors

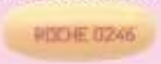
Fuzeon (enfuvirtide, T-20) Fusion Inhibitor

Selzentry (maraviroc, MVC) CCR5 Antagonist

Discontinued Medications or Formulations

Agenerase (amprenavir, APV)

Fortovase (saquinavir soft gel capsule, SQV)



Hivid (zalcitabine, ddC)

Kaletra (lopinavir/ritonavir, LPV/r)

Videx (didanosine, ddI)

Integrase Inhibitors

Isentress (raltegravir, RAL)

*Also available in liquid form

Medications current as of 3/08

Methods

- **Used modified Rao-Scott chi-square tests to assess the relationship between adherence and**
  - Two measures of viral suppression from medical record
    - Recent: most recent viral load undetectable or $\leq$ 200 copies/ml
    - Durable: all viral loads in past 12 months undetectable or < 200 copies/ml
  - Self-reported use of and unmet need for adherence support services
- **Multivariable logistic regression to identify factors independently associated with adherence**
  - Backward elimination with $p < 0.10$ inclusion and $p < 0.05$ retention criteria
- **Analyses accounted for clustering, unequal selection probabilities, and non-response**

ADHERENCE, VIRAL SUPPRESSION, AND ADHERENCE SUPPORT SERVICES

Prevalence of Self-Reported ART Adherence and Association with Viral Suppression

		Total%
100% adherent	Yes	86
	No	14

		Virally Suppressed Row %			Durably Virally Suppressed Row %		
		Yes	No	P value	Yes	No	P value
100% adherent	Yes	82	18		66	34	
	No	65	35	<.0001	50	50	<.0001

All percentages are weighted.

Self-Reported Use of and Need for Adherence Support Services Among HIV-infected Adults on ART, past 12 months

Adherence support services	Total %
Received	20
Unmet need	2
Did not receive or need	78

	100% adherent Row %		
Adherence support services	Yes	No	P value
Received	83	17	
Unmet need	46	54	
Did not receive or need	87	13	<.0001

All percentages are weighted.

FACTORS INDEPENDENTLY ASSOCIATED WITH ADHERENCE

Variables Considered for Inclusion in Multivariable Logistic Model

- Age
- Gender
- Race
- Education
- Poverty
- Homelessness
- Incarceration
- Depression
- Stimulant use
- Binge drinking
- Health coverage/insurance
- Years since HIV diagnosis
- One daily dose
- Side effects
- Being sure can take medicine
- Being sure medication has positive effect
- Being sure of resistance if nonadherent
- Social support

Multivariable Logistic Regression Model of Factors Independently Associated with Adherence, MMP 2009 (1 of 3)

		Adherent %	Adjusted Prevalence Ratio	95% Confidence Interval
Age	18-29	78	Ref.	-
	30-39	82	1.10	(1.01-1.19)
	40-49	86	1.15	(1.05-1.27)
	50+	88	1.16	(1.07-1.27)
Gender	Male	87	1.04	(1.01-1.07)
	Females	83	Ref.	-
	Transgender	75	0.97	(0.86-1.09)
Years since HIV diagnosis	0-4	89	1.06	(1.02-1.10)
	5-9	86	1.02	(0.98-1.07)
	10+	84	Ref.	-

Variables included in the model: age, gender, years since HIV diagnosis, depression, stimulant use, binge drinking, once daily ART dosing, side effects, sure can take ART, sure of resistance. All percentages are weighted.

Multivariable Logistic Regression Model of Factors Independently Associated with Adherence, MMP 2009 (2 of 3)

		Adherent %	Adjusted Prevalence Ratio	95% Confidence Interval
Depression	No	87	1.04	(1.00-1.08)
	Yes	80	Ref.	-
Stimulant use	No	87	1.15	(1.09-1.23)
	Yes	70	Ref.	-
Binge drinking	No	88	1.11	(1.06-1.16)
	Yes	76	Ref.	-

Variables included in the model: age, gender, years since HIV diagnosis, depression, stimulant use, binge drinking, once daily ART dosing, side effects, sure can take ART, sure of resistance. All percentages are weighted.

Multivariable Logistic Regression Model of Factors Independently Associated with Adherence, MMP 2009 (3 of 3)

		Adherent %	Adjusted Prevalence Ratio	95% Confidence Interval
Once daily ART dosing	No	83	Ref.	-
	Yes	88	1.05	(1.02-1.09)
Troubled by side effects	Never/rarely	87	1.06	(1.01-1.11)
	More than half time		Ref.	-
How sure can take ART as directed	Not at all/somewhat	53	Ref.	-
	Very/extremely	88	1.44	(1.28-1.63)
Sure of resistance if do not take medications as instructed	Not at all/somewhat	79	Ref.	-
	Very/extremely	87	1.06	(1.01-1.11)

Variables included in the model: age, gender, years since HIV diagnosis, depression, stimulant use, binge drinking, once daily ART dosing, side effects, sure can take ART, sure of resistance. All percentages are weighted.

Model Summary: Variables Independently Associated with Adherence

- Age
- Gender
- Depression
- Stimulant use
- Binge drinking
- Years since HIV diagnosis
- One daily dose
- Side effects
- Being sure can take medicine
- Being sure of resistance if nonadherent

Limitations

- Adherence measure likely overestimates actual adherence
- Measurement of adherence and viral load were not necessarily contemporaneous
- Lower than optimal response rates, but estimates were adjusted for nonresponse

Conclusions

- **High self-reported adherence, but differences between groups**
  - Lower among groups studies have shown to have poorer health, lower access to care, and higher levels of sexual risk behaviors
- **Multivariable analysis suggests key areas for intervention**
  - Targeted programs for youth and females
  - Screen and treat for depression, drug use, and binge drinking
  - Address side effects and minimize daily doses
  - Regularly discuss medication beliefs and increase self-efficacy

Acknowledgments

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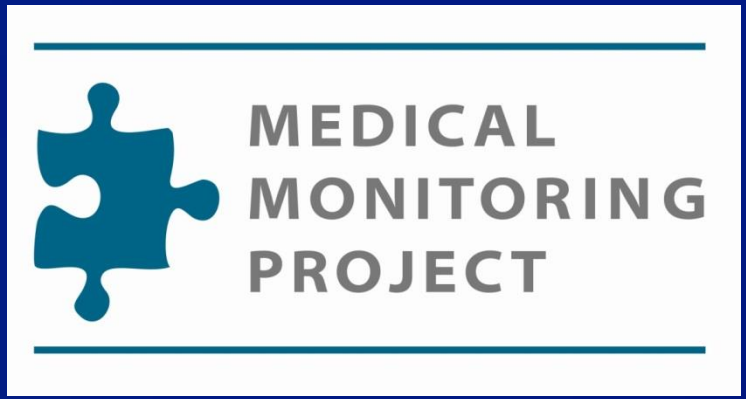

Thank you!

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