

**The Costs and Effects  
of Outreach Strategies  
that Engage and Retain People  
with HIV/AIDS in Primary Care**

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## Abstract

Many individuals with HIV/AIDS do not receive adequate care, often because they are not engaged in the health care system. Outreach programs can address this problem by increasing awareness of appropriate care and connecting individuals to health care services. Little is known, however, about the links between specific characteristics of outreach encounters and retention in care, or about the costs associated with different types of encounters. To address these gaps, this report analyzes the outcomes and costs of the Outreach Initiative, funded by the U.S. Department of Health and Human Services, Health Resources and Services Administration, HIV/AIDS Bureau. In particular, the effects of outreach encounter characteristics on highly active anti-retroviral therapy (HAART) use and missed appointments are examined. These characteristics included frequency, duration, purpose and the type of staff leading the encounter (e.g., medical professionals versus licensed outreach workers). Encounters with medical professionals decreased the probability of missed medical appointments, possibly because interactions with medical professionals generated a sense of trust that prompted participants to seek medical care. By contrast, frequent encounters with different types of staff encouraged participants to adhere to HAART, possibly because continuous contact reminds participants to take their medication. Because medical professionals are costly, they should be incorporated into a small number of encounters early on in the program. These encounters should then be followed up with frequent, less expensive encounters.

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# 1 INTRODUCTION

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Significant disparities exist in the degree to which individuals can readily access the health care system (Fiscella, Franks, Gold, & Clancy, 2000). These disparities are especially pronounced among individuals with HIV/AIDS, who are less likely to be engaged in primary health care if they are minorities (Andersen et al., 2000; Gebo et al., 2005; Montoya, Trevino, & Kreitz, 1999), immigrants (Ku & Matani, 2001), or poor, or uninsured (Andersen et al., 2000; Montoya et al., 1999; Shapiro et al., 1999). Additional efforts are required to reach such persons and bring them into regular care. One way to achieve this goal is through a program of outreach that promotes contact between trained workers and members of the target population. Strategies that target underserved populations with HIV/AIDS typically aim to increase awareness of appropriate care and connect individuals to health care services.

This report evaluates the costs and effects of a program funded by the Health Resources and Services Administration (HRSA) through its Special Programs of National Significance (SPNS) called Targeted HIV Outreach and Intervention Model Development and Evaluation for Underserved HIV-Positive Populations Not in Care (the Outreach Initiative). The goal of the Outreach Initiative was to encourage individuals with HIV/AIDS to connect with and stay engaged in HIV/AIDS medical care.

## 1.1 The Role of Outreach Programs for HIV/AIDS

Outreach workers can help underserved populations make and keep primary care appointments by providing and/or coordinating a range of services, including case management, transportation, and drug treatment (Ashman, Conviser, and Pounds, 2002; Conover and Whetten-Goldstein, 2002; Knowlton et al., 2001). Patients who consistently seek medical care are more likely to take HIV/AIDS medications appropriately (Berg et al., 2005; Giordano et al., 2003). One study found that patients who missed fewer than 25 percent of their appointments had a greater likelihood of receiving HAART (Keruly, Conviser, and Moore, 2002). Adherence to a regimen of HAART is especially high when physicians and patients have a strong, communicative relationship, and the physician has the information and expertise necessary to tailor the regimen to the patient's particular habits, preferences, and needs (Chesney, 2003; Schneider, Kaplan, Greenfield, Li, and Wilson, 2004).

HAART adherence yields a number of positive clinical outcomes, from increased CD4 counts to decreased viral load and opportunistic infections. According to one study, only seven percent of people who had moderate or high adherence to HAART progressed to AIDS or died, whereas 43 percent of patients with low levels of adherence faced similar outcomes (Kitahata et al., 2004). Improved clinical measures in turn lead to better survival and quality of life. Significant negative

associations have been shown between viral load and several quality of life indicators, including physical role functioning, bodily pain, general health, emotional role functioning, and vitality (Call et al., 2000). Other studies have shown that patients who report 100 percent adherence to HAART score significantly higher on quality of life surveys than those who report less consistent adherence; even more, clinical outcomes for the first group are better than for the second group (e.g., Mannheimer et al., 2005).

## **1.2 Prospectus for the Evaluation**

Although there is good reason to believe that outreach in general is a valuable intervention, little is currently known about what makes an outreach effort successful, or about how much different types of encounters cost. At the coarsest level, how many encounters are required to achieve the desired outcome(s)? Put differently, to what extent does the success of an outreach program depend upon the frequency of encounters that participants receive? At a more fine-grained level, are some types of staff better than others at achieving particular outcomes (such as HAART use)? To what extent does the duration of an encounter matter? Can encounters succeed by phone or email as well as in person (i.e., does the means of contact matter)?

In practice, encounters are comprised of several characteristics combined into encounter types; all encounters are carried out for a specific length of time by a particular kind of staff member using a specific means of contact for a particular purpose. Which combinations of characteristics (encounter types) succeed, and which fail? Finally, how much do different encounter types cost? Program costs can vary widely depending on a variety of factors, including the frequency of encounters and the training of outreach workers. Information costs and effectiveness will help the designers and implementers of outreach programs to allocate their scarce staff and funding resources in an efficient manner.

Because the Outreach Initiative makes available both outreach encounter data and budget data, it offers an opportunity to answer these vital questions about outreach programs. This analysis examines how retention in primary health care is affected by different outreach encounter characteristics. By estimating the costs associated with these encounter characteristics, this analysis offers some insights regarding which outreach strategies generate the greatest benefits for the fewest dollars.

## 2 METHODS

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The methods used for this study are described in the following section. Section 2.1 describes the study setting and the target population. Sections 2.2 and 2.3 detail the predictor variables and outcome variables, respectively. Section 2.4 describes how individual predictor variables were combined into “encounter types.” Finally, Section 2.5 details the regression model used in the analysis.

### 2.1 Study Setting and Population

Data for this analysis were collected during the second phase of the Outreach Initiative, implemented between 2004 and 2006.<sup>1</sup> HRSA funded Outreach Initiative grantees to implement and evaluate proactive strategies for bringing and retaining members of underserved populations with HIV/AIDS in the health care system. Data were collected and analyzed from the following seven grantees:<sup>2</sup>

- Carelink Program, Multnomah County Health Department (Cascade, Portland, OR)
- Fenway Community Health (Fenway, Boston, MA)
- Well-Being Institute (WB, Detroit, MI)
- Whitman-Walker Clinic (WW, Washington, DC)
- Project Horizons, Wayne State University (WS, Detroit, MI)
- Caring Connections, University of Miami School of Medicine (UM, Miami, FL)
- UCLA Division of Medicine and Health Services Research (Drew/UCLA, Los Angeles, CA)

Grantees targeted people living with HIV/AIDS who were not currently engaged in primary care or who were at risk of falling out of care. Sub-populations within this umbrella group varied significantly. Some grantees focused on narrow population groups; for example, two grantees served only women, while one grantee served only youth. Four grantees provided services to a combined group of homeless people, drug injection users, people of low socio-economic status, sex workers, ethnic and sexual minorities, and incarcerated people.

Program enrollees were identified through screening tools at participant intake, hospital databases of sporadic users of care, partnerships with CBOs, and mobile testing vans. Once participants were enrolled, grantees employed a diverse set of outreach strategies to encourage them to access and remain in primary care. Over the 3-year period, the seven grantees carried out

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<sup>1</sup> The Outreach Initiative was funded between 2001 and 2006 in two phases. This analysis was conducted with data collected during the second phase.

<sup>2</sup> Three grantees were excluded because their data were unavailable or not comparable to the other sites.

almost 11,000 outreach encounters, which ranged from accompanying participants to their medical appointments to referring participants to ancillary services, such as mental health and drug rehabilitation treatment programs. Regardless of the settings in which these encounters occurred (hospitals, CBOs, client homes), all such encounters are regarded as outreach encounters for the purposes of this report. (See Appendix A for more information on grantees and program participants.)

Data on Outreach Initiative participants were collected through interviews and medical abstracts. Participants were interviewed upon enrollment (baseline), 6 months later, and 12 months later. Grantees collected participants' medical data from hospital partners at the same time intervals. For most outreach recipients, grantees were able to determine key demographic characteristics, clinical measures, and health utilization patterns. This analysis includes data on 644 of the 847 participants from the seven grantees; 203 participants were excluded primarily because they lacked baseline CD4 counts.

Data were also collected on each outreach encounter. When workers completed an encounter, they filled out a form, describing their staff position and the duration, location and purpose of the encounter.

## **2.2 Outcome Variables**

This report measures whether outreach encounter characteristics significantly affected engagement and retention in primary care, as reflected in two important outcomes: the frequency of missed appointments and HAART use.

Prior studies have found that patient compliance with medical follow-up predicts the progression of HIV/AIDS (Berg et al., 2005; Lucas, Chaisson, and Moore, 1999; Rastegar, Fingerhood, and Jasinski, 2003). As a result, clinical guidelines recommend that most people living with HIV/AIDS should receive primary care services at least once every 3 months (Cabral et al., 2007).<sup>3</sup> Participants were classified as having missed appointments if they reported missing an appointment in the preceding 6 months. The outcome measure was defined as a binary variable indicating whether participants had a missed appointment or not.

Appropriate HAART use by persons with HIV/AIDS indicates ongoing, higher-quality care. The clinical literature suggests that HAART use (in particular, early use) increases CD4 counts, suppresses viral loads, slows the progression of HIV, and reduces the likelihood of opportunistic infections (Giordano et al., 2003; Keruly et al., 2002). The appropriateness of therapy was measured using guidelines that were widely accepted during the study period (Yeni et al., 2004). According to these guidelines, HAART should be used by all patients with CD4 counts of < 200

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<sup>3</sup> Primary care services are defined as medical care provided by a doctor, nurse practitioner or physician assistant who can monitor CD4 counts and viral loads and prescribe HIV/AIDS medications.

cells/ $\mu$ L, by most patients with CD4 counts of 200-350 cells/ $\mu$ L, and by patients with high viral loads ( $>50,000/\mu$ L). After excluding those participants whose care providers recommended against using HAART and those who experienced unacceptable side effects (as determined from medical records), a separate dataset was created consisting solely of those participants who qualified for HAART. The outcome measure was then defined as a binary variable indicating whether participants in this group were using HAART.<sup>4</sup> Note that this analysis does not assess different levels of HAART adherence. During interviews, clients indicated whether they were *taking* HAART, but not how frequently.

### 2.3 Predictor Variables

This analysis includes two classes of predictor variables: encounter frequency and encounter characteristics. Encounter frequency is simply the number of encounters each participant received. Because the effect of outreach encounter frequency appears to be non-linear (Cabral et al., 2007), the number of outreach encounters was divided into 4 categories – 0, 1-5 encounters, 6-15 encounters, and 16+ encounters (for the first set of analyses).

Encounter characteristics can be thought of in two ways – as the individual components of an encounter or as the aggregate encounter type encompassing all characteristics (as noted in the Introduction). The four types of encounter characteristics used as predictor variables were:

- **Type of Staff Implementer:** Outreach encounters were implemented by staff ranging from physicians to peer volunteers. Because varying educational backgrounds and levels of experience among different staff types may have affected the success of outreach encounters, staff were divided into four categories: 1) medical professionals, 2) licensed outreach specialists, 3) non-licensed outreach workers, and 4) paraprofessionals. (See Appendix B for more information on the classification of staff).
- **Duration:** Outreach encounters ranged from 5-minute phone calls to 60-minute educational sessions. Because the amount of time outreach workers spent with their participants could have also affected encounter success, encounter length was divided into three duration categories: 1) less than 15 minutes, 2) between 15 and 30 minutes, and 3) more than 30 minutes.
- **Contact:** Contact refers to how the outreach worker contacted the participant. It was assumed that face-to-face encounters would be more effective than encounters conducted at a distance. Thus two contact categories were created: face-to-face and not face-to-face. Face-to-face encounters primarily consisted of contacts within the participants' homes, medical clinics, and program offices. Encounters not implemented face-to-face were conducted via phone, email or postal mail.
- **Purpose:** The main purpose behind each encounter varied as staff tried to address participants' different needs. In some cases, outreach workers provided information on

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<sup>4</sup> HAART use was a self-reported variable. This analysis assumes that clients who reported the use of HAART had high adherence levels.

the program, HIV/AIDS, or medication; in other cases, they coordinated appointments or ancillary services. Detailed information was collected on the purpose of each outreach encounter. However, because reporting varied across grantees, and because the number of encounter purposes was large, they were divided into two main types: 1) accompanying the participant to an appointment, and 2) all other types.

The number of encounters of a given characteristic that occurred in each 6-month period was tabulated for each participant. For example, a participant could have experienced an encounter that was greater than 30 minutes where he/she was accompanied to a medical appointment by a paraprofessional. This participant was therefore considered as having received one short duration encounter, one paraprofessional encounter, one face-to-face encounter, and one encounter that involved being accompanied to a medical appointment. All encounter types were then summed for all participants to act as the independent variables in the analysis.

## 2.4 Encounter Types

As described earlier, each encounter is comprised of several different characteristics in combination. In the next set of analyses, a series of distinct encounter types are used as predictor variables to evaluate how different combinations of characteristics affected outcomes. Recall that there were 11 encounter characteristics: 4 types of staff (medical professionals, paraprofessionals, licensed outreach workers, and peer volunteers), 3 durations (less than 15 minutes, 15 to 30 minutes, and greater than 30 minutes), 2 means of contact (face-to-face and not face-to-face), and 2 purposes (accompanying the participant to a medical appointment, or some other purpose), for a total of  $4 \times 3 \times 2 \times 2 = 48$  encounter types.

Because it is difficult to reliably estimate the impact of infrequent encounter types, this analysis is restricted to the 11 types listed in Table 2.1. The number of times each participant experienced one of the 10 most common encounter types is tabulated. The “Miscellaneous” category (roughly 14 percent of the encounters) includes the other 38 encounter types.

**Table 2.1: Encounter Types and Frequencies**

Encounter Type	Staff	Duration (mins)	Contact	Purpose	Freq.
1	Licensed outreach worker	<15	Not face-to-face	Other	8%
2	Non-licensed outreach worker	<15	Not face-to-face	Other	28%
3	Non-licensed outreach worker	<15	Face-to-face	Other	11%
4	Paraprofessional	<15	Not face-to-face	Other	11%
5	Non-licensed outreach worker	15-30	Not face-to-face	Other	4%
6	Non-licensed outreach worker	15-30	Face-to-face	Other	8%
7	Medical professional	30+	Face-to-face	Other	2%
8	Non-licensed outreach worker	30+	Face-to-face	Other	1%
9	Non-licensed outreach worker	30+	Face-to-face	Accompany	5%
10	Paraprofessional	30+	Face-to-face	Other	9%
11	Miscellaneous				14%

\* Numbers do not add up to 100% due to rounding.

## 2.5 Regression Model

A similar logistic regression model was used for all analyses (dose levels, encounter characteristics, and encounter types). Outcomes were compared between the pre-intake 6 month period and post-intake 6 month period. Because there was substantial attrition between interview periods, later periods were excluded. The unit of analysis was each participant during a particular period. To account for the inclusion of multiple observations from the same person, block bootstrap standard errors clustered at the person level were calculated.

Binary outcomes were treated as functions of the frequency levels, encounter characteristics, or encounter types, controlling for baseline medical and socioeconomic variables. The coefficients obtained from the logistic regressions capture the effect of adding an additional outreach encounter of a particular kind in a 6 month period (whether considered as isolated characteristics or as types), or of having a given number of encounters (in the case of encounter frequency).

Because estimating dozens of coefficients increases the probability of Type I errors (false positives – treating results as statistically significant when in fact they are not), p-values were adjusted using the Holm-Bonferroni procedure.<sup>5</sup> To account for intra-person correlation (i.e., having multiple observations from the same individual) several other models were tested, including a random effects model and a generalized estimating equations approach. The choice of model did not substantially alter the results.

All analyses accounted for the following potential explanatory variables: gender, race/ethnicity,<sup>6</sup> age group (15-24 years, 25-39 years, 40-54 years, and 55+ years), education,<sup>7</sup> similarities and differences among patients according to grantee,<sup>8</sup> homelessness, mental health problems, role as a primary caregiver (for children, elderly, or adults with HIV/AIDS), drug or alcohol abuse in the 30 days prior to intake, and private or public health insurance. The analyses controlled for whether the participant had a case manager at baseline and whether the participant was satisfied with his or her primary care provider (as obtained from interview data), as well as for whether the participant fell into one of three categories of CD4 counts: less than 200, 200 to less than 350, or 350 or greater. Although some of these explanatory variables could have changed over

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<sup>5</sup> In the Holm-Bonferroni procedure (Holm, 1979), the p-values from a given set of tests are ordered from smallest to largest. Each test is then evaluated sequentially by dividing the pre-specified significance level by the number of remaining tests. For example, if there are 10 tests and the alpha is set at 0.10, the smallest p-value must be less than 0.010 for *any* p-value to be considered significant. If the lowest p-value is smaller than 0.010, one proceeds to the next-smallest p-value, which must be less than 0.10/9, or 0.011. This process is repeated until a p-value exceeds 0.10/*n*, where *n* is the number of remaining (unevaluated) tests. At this point, all remaining tests are considered not significant.

<sup>6</sup> Race/ethnicity includes three categories: White – Non-Hispanic, Black – Non-Hispanic, Hispanic/Other.

<sup>7</sup> Level of education includes three categories: 0 through the 11th grade, 12th grade, and greater than 12th grade.

<sup>8</sup> The model clustered patients by grantee.

the course of the outreach program (especially CD4 count), the analysis was limited to baseline values, because improvements in the outcome variables (missed medical appointments and HAART use) due to outreach efforts could affect later values of the explanatory variables.

### 3 RESULTS

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The results suggest that using medical professionals for outreach encounters may increase the likelihood that individuals with HIV/AIDS will seek regular primary care. However, this increased likelihood did not translate into demonstrable gains in HAART use. On the other hand, participants appear to have benefited from large numbers of encounters, as seen in the increase in HAART use among eligible participants. Not surprisingly, encounters with medical professionals are more expensive than encounters with other staff types.

#### 3.1 Effects of Encounters on Medical Appointments and HAART Use

A series of regression models is presented in this subsection. First, the frequency at which encounters were implemented is examined, followed by the effects of individual encounter characteristics. Next, the effects of encounter characteristics in combination when they are considered as encounter types are examined. Finally, to clarify some of the findings, an analysis that combines frequency level with staff type and with encounter type is presented. For each model, effects on the two outcome variables, missed visits, and HAART use are included.

##### *Effects of Encounter Frequency, Characteristics, and Type*

A small number of encounters (1-5) decreased the probability of a missed visit by 7.7 percent. Larger numbers of encounters did not produce significant changes in the probability of a missed visit (Table 3.1).

**Table 3.1: Effects of Encounter Frequency on Missed Medical Appointments**

Number of Encounters	Coefficient	P-Value
1-5	-0.077**	0.016
6-15	-0.083	0.107
16+	0.075	0.264

\*  $p < 0.1$  ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . All p-values are Holm-Bonferroni corrected.

All 3 frequency levels led to more participants using HAART, though only the categories for larger numbers of encounters (6-15 and 16+) led to statistically significant improvements – 12.1 percent and 19.0 percent, respectively (Table 3.2).

**Table 3.2: Effects of Encounter Frequency on HAART Use**

Number of Encounters	Coefficient	P-Value
1-5	0.055	0.171
6-15	0.121**	0.017
16+	0.190***	0.000

\* p < 0.1 ; \*\* p < 0.05; \*\*\* p < 0.01. All p-values are Holm-Bonferroni corrected.

Adding an encounter with a medical professional decreased the probability of a missed visit by 7.8 percent. No other characteristic reliably altered the probability of missed visits (Table 3.3).

**Table 3.3: Effects of Encounter Characteristics on Missed Medical Appointments**

Type of Encounter Characteristic	Encounter Characteristic	Coefficient	P-Value
Staff	Medical professional	-0.078***	0.000
	Licensed outreach specialist	-0.024	0.102
	Non-licensed outreach worker	0.007	0.076
	Paraprofessional	0.009	0.265
Duration	<15 min	-0.007	0.270
	15-29 min	-0.006	0.585
	30 min+	-0.001	0.933
Purpose	Accompany	0.007	0.780
	Other	-0.005	0.191
Contact	Face-to-face	-0.015	0.052
	Not face-to-face	0.002	0.747

\* p < 0.1 ; \*\* p < 0.05; \*\*\* p < 0.01. All p-values are Holm-Bonferroni corrected.

The results show no evidence that any particular encounter characteristic produced a statistically reliable change in HAART use (Table 3.4). Although licensed outreach workers increased the probability of HAART use by 4.5 percent, and accompanying participants to their appointments increased HAART use by 4.9 percent, neither of these effects remained significant after correcting for multiple tests.

**Table 3.4: Effects of Encounter Characteristics on HAART Use**

Type of Encounter Characteristic	Encounter Characteristic	Coefficient	P-Value
Staff	Medical professional	-0.034	0.90
	Licensed outreach worker	0.045	0.270
	Non Licensed Outreach worker	0.005	0.303
	Paraprofessional	0.023	0.075
Duration	<15 min	0.010	0.254
	15-29 min	0.001	0.974
	30 min+	0.023	0.159
Purpose	Accompany	0.049	0.008
	Other	0.008	0.227
Contact	Face-to-face	0.007	0.450
	Not Face-to-face	0.017	0.101

No coefficients are significant (after Holm-Bonferroni correction).

An encounter from a medical professional and receiving more than 30 minutes of face-to-face time decreased the probability of a missed medical appointment by 17.1 percent (Table 3.5). Other outreach encounters were not associated with statistically significant changes in medical appointment attendance.

**Table 3.5: Effects of Encounter Type on Missed Medical Appointments**

Encounter Type	Staff	Duration (mins)	Contact	Purpose	Coefficient	P-Value
1	Licensed outreach worker	<15	0.385	Other	-0.017	0.385
2	Non-licensed outreach worker	<15	0.020	Other	0.015	0.020
3	Non-licensed outreach worker	<15	0.444	Other	-0.011	0.444
4	Paraprofessional	<15	0.491	Other	0.009	0.491
5	Non-licensed outreach worker	15-30	0.563	Other	0.013	0.563
6	Non-licensed outreach worker	15-30	0.781	Other	-0.006	0.781
7	Medical professional	30+	0.000	Other	-0.171***	0.000
8	Non-licensed outreach worker	30+	0.772	Other	0.005	0.772
9	Non-licensed outreach worker	30+	0.686	Accompany	0.012	0.686
10	Paraprofessional	30+	0.542	Other	0.014	0.542
11	Miscellaneous				-0.013	0.475

\* p < 0.1 ; \*\* p < 0.05; \*\*\* p < 0.01. All p-values are Holm-Bonferroni corrected.

Although Encounter Type 7 was associated with a decrease in missed appointments, the same encounter type was not associated with an increase in HAART use. In fact, Encounter Type 7 seemed to decrease HAART use, though this effect was not statistically reliable (Table 3.6). This result may be due to the fact that grantees tended to use medical professionals with participants who needed the most support (Rajabiun et al., 2006); these participants tended to experience worse outcomes.

**Table 3.6: Effects of Encounter Type on HAART Use**

Encounter Type	Staff	Duration	Contact	Purpose	Coefficient	P-Value
1	Licensed outreach worker	<15	Not face-to-face	Other	0.035	0.253
2	Non-licensed outreach worker	<15	Not face-to-face	Other	0.010	0.435
3	Non-licensed outreach worker	<15	Face-to-face	Other	-0.011	0.338
4	Paraprofessional	<15	Not face-to-face	Other	0.004	0.577
5	Non-licensed outreach worker	15-30	Not face-to-face	Other	-0.036	0.859
6	Non-licensed outreach worker	15-30	Face-to-face	Other	-0.010	0.306
7	Medical professional	30+	Face-to-face	Other	-0.092	0.772
8	Non-licensed outreach worker	30+	Face-to-face	Other	0.022	0.249
9	Non-licensed outreach worker	30+	Face-to-face	Accompany	0.034	0.181
10	Paraprofessional	30+	Face-to-face	Other	-0.012	0.147
11	Miscellaneous				0.050	0.725

No coefficients are significant (after Holm-Bonferroni correction).

### *Analyzing Staff and Encounter Types by Frequency*

These analyses so far suggest several tentative conclusions. First, smaller frequencies (1-5 encounters) led to a reliable reduction in missed medical appointments, whereas larger frequencies (6 or more encounters) did not (Table 3.1). This reduction in missed medical appointments appears to have been driven by medical professionals rather than by other kinds of outreach workers – or by other encounter characteristics (Table 3.3). Second, larger frequencies (greater than 6 encounters) led to an increased use of HAART (Table 3.2), though this reduction does not appear to have been caused by any one kind of outreach worker.

The analyses that follow attempt to clarify the relationship between frequency, staff type, and encounter type. More specifically, staff type and encounter type are subdivided by frequency level.

Table 3.7 and Table 3.8 divide staff types into two sub-categories: medical professionals and all other outreach workers. There are two reasons for this division. First, the analyses have consistently indicated that medical professionals have an effect, but it is not yet clear how that effect might vary as a function of frequency. Second, it is possible that encounters with individual types of non-medical professionals may have relatively weak effects; by aggregating all non-medical outreach workers into a single category, it may be easier to detect those effects.

Encounters with medical professionals reduced missed medical appointments at two frequency levels: 1-5 and 6-15 encounters (Table 3.7). At higher frequency levels, there were too few encounters with medical professionals to estimate a coefficient. This is not surprising, given that medical professionals participated in outreach relatively infrequently. As seen in Table 2.1, Encounter Type 7 – the only common encounter type involving medical professionals – accounted for only 2 percent of all encounter types also indicates that large numbers of

encounters with other types of staff actually *increased* the number of missed medical appointments (Table 3.7). This finding is difficult to interpret, though it may indicate that programs made a special effort to target individuals who missed their appointments; under this interpretation, the number of missed appointments predicts the number of encounters, rather than the other way around.

**Table 3.7: Effects of Frequency and Staff Type on Missed Medical Appointments**

Number of Encounters	Staff	Coefficient	P-Value
1-5	Medical professional	-0.281***	0.000
	Other	-0.007	0.847
6-15	Medical professional	-0.314***	0.000
	Other	-0.005	0.921
16+	Medical professional	n/a <sup>†</sup>	
	Other	0.140*	0.014

\* p < 0.1 ; \*\* p < 0.05; \*\*\* p < 0.01. All p-values are Holm-Bonferroni corrected.

<sup>†</sup> Too few observations to estimate a coefficient.

As shown in Table 3.8, encounters with other (non-medical) outreach workers increased the use of HAART at the two higher frequency levels. Encounters with medical professionals actually *decreased* use of HAART at the mid-range frequency (6-15 encounters), though this finding is not easy to explain. Again, encounters with medical professionals were too rare to estimate a coefficient.

**Table 3.8: Effects of Frequency and Staff Type on HAART Use**

Number of Encounters	Staff	Coefficient	P-Value
1-5	Medical professional	-0.063	0.501
	Other	0.071*	0.043
6-15	Medical professional	-0.433**	0.007
	Other	0.169***	0.000
16+	Medical professional	n/a <sup>†</sup>	
	Other	0.207***	0.000

\* p < 0.1 ; \*\* p < 0.05; \*\*\* p < 0.01. All p-values are Holm-Bonferroni corrected.

<sup>†</sup> Too few observations to estimate a coefficient.

Table 3.9 and Table 3.10 present coefficients for the 11 Encounter Types by frequency, Table 3.9 for missed medical appointments and Table 3.10 for HAART use. Because some encounter types occurred rarely at the highest frequency, these tables present just two frequency levels: 1-5 and 6+. These tables confirm previous results. Encounters with medical professionals led to fewer missed medical appointments (though only at the lower frequency), but they had no effect on HAART use. Encounters with other outreach workers had no effect either on missed medical appointments or on HAART use. These results may seem to be at odds with the results of Table

3.7 and Table 3.8, which show that non-medical outreach workers decreased missed medical appointments and increased HAART use, at least at some frequencies. However, note that Table 3.7 and Table 3.8 collapse all non-medical outreach workers into a single category, thereby making it easier to detect any effects that would otherwise be diluted.

**Table 3.9: Effects of Frequency and Encounter Type on Missed Medical Appointments**

Number of Encounters	Encounter Type	Staff	Duration (mins)	Contact	Purpose	Coefficient	P-Value
1-5	1	Licensed outreach worker	<15	Not face-to-face	Other	-0.11	0.023
	2	Non-licensed outreach worker	<15	Not face-to-face	Other	-0.06	0.25
	3	Non-licensed outreach worker	<15	Face-to-face	Other	-0.04	0.462
	4	Paraprofessional	<15	Not face-to-face	Other	0.09	0.13
	5	Non-licensed outreach worker	15-30	Not face-to-face	Other	-0.08	0.263
	6	Non-licensed outreach worker	15-30	Face-to-face	Other	-0.01	0.862
	7	Medical professional	30+	Face-to-face	Other	-0.31***	0.000
	8	Non-licensed outreach worker	30+	Face-to-face	Other	0.03	0.589
	9	Non-licensed outreach worker	30+	Face-to-face	Accompany	0.13*	0.094
	10	Paraprofessional	30+	Face-to-face	Other	-0.03	0.155
	11	Miscellaneous				-0.03	0.449
6+	1	Licensed outreach worker	<15	Not face-to-face	Other	-0.05	0.692
	2	Non-licensed outreach worker	<15	Not face-to-face	Other	0.16	0.096
	3	Non-licensed outreach worker	<15	Face-to-face	Other	-0.25	0.044
	4	Paraprofessional	<15	Not face-to-face	Other	0.10	0.461
	5	Non-licensed outreach worker	15-30	Not face-to-face	Other	-0.02	0.957
	6	Non-licensed outreach worker	15-30	Face-to-face	Other	0.26	0.213
	7	Medical professional	30+	Face-to-face	Other	n/a <sup>†</sup>	
	8	Non-licensed outreach worker	30+	Face-to-face	Other	0.15	0.589
	9	Non-licensed outreach worker	30+	Face-to-face	Accompany	0.16	0.533
	10	Paraprofessional	30+	Face-to-face	Other	-0.11	0.557
	11	Miscellaneous				-0.10	0.541

\* p < 0.1 ; \*\* p < 0.05; \*\*\* p < 0.01. All p-values are Holm-Bonferroni corrected.

<sup>†</sup> Too few observations to estimate a coefficient.

**Table 3.10: Effects of Frequency and Encounter Type on HAART Use**

Number of Encounters	Encounter Type	Staff	Duration (mins)	Contact	Purpose	Coefficient	P-Value
1-5	1	Licensed outreach worker	<15	Not face-to-face	Other	0.096	0.118
	2	Non-licensed outreach worker	<15	Not face-to-face	Other	0.074	0.181
	3	Non-licensed outreach worker	<15	Face-to-face	Other	0.019	0.730
	4	Paraprofessional	<15	Not face-to-face	Other	-0.054	0.501
	5	Non-licensed outreach worker	15-30	Not face-to-face	Other	-0.003	0.968
	6	Non-licensed outreach worker	15-30	Face-to-face	Other	0.034	0.604
	7	Medical professional	30+	Face-to-face	Other	-0.294	0.024
	8	Non-licensed outreach worker	30+	Face-to-face	Other	-0.025	0.706
	9	Non-licensed outreach worker	30+	Face-to-face	Accompany	-0.047	0.573
	10	Paraprofessional	30+	Face-to-face	Other	0.012	0.894
	11	Miscellaneous				0.192	0.000
6+	1	Licensed outreach worker	<15	Not face-to-face	Other	n/a <sup>†</sup>	
	2	Non-licensed outreach worker	<15	Not face-to-face	Other	0.137	0.054
	3	Non-licensed outreach worker	<15	Face-to-face	Other	-0.052	0.783
	4	Paraprofessional	<15	Not face-to-face	Other	0.000	0.000
	5	Non-licensed outreach worker	15-30	Not face-to-face	Other	-0.673	0.000
	6	Non-licensed outreach worker	15-30	Face-to-face	Other	0.203	0.305
	7	Medical professional	30+	Face-to-face	Other	n/a <sup>†</sup>	
	8	Non-licensed outreach worker	30+	Face-to-face	Other	0.058	0.740
	9	Non-licensed outreach worker	30+	Face-to-face	Accompany	-0.010	0.950
	10	Paraprofessional	30+	Face-to-face	Other	n/a <sup>†</sup>	
	11	Miscellaneous				0.057	0.728

No coefficients are significant (after Holm-Bonferroni correction).

<sup>†</sup> Too few observations to estimate a coefficient.

### 3.2 Cost Analysis

With a greater understanding of which outreach encounter characteristics affect outcomes in retention and care, the costs associated with those characteristics can now be assessed. Cost data on outreach encounters were obtained from 2004 and 2005 grantee budgets and interviews with program implementers. This analysis focused on the costs incurred at the time of the encounter, describing how these costs were assigned to the various encounter characteristics and then used to calculate the costs of the most common encounter types.

#### *Type of Staff Implementer*

Each staff member who implemented outreach encounters (identified in grantee budgets) was assigned to each of the four categories within the staff implementer characteristic: 1) medical professionals, 2) licensed outreach specialists, 3) non-licensed outreach workers, and 4) paraprofessionals. Cost per minute was calculated by dividing the average yearly salary of staff in each category by the number of minutes a full time employee works. Medical professionals were the most expensive and the paraprofessionals were the least expensive (Table 3.11).

**Table 3.11: Cost Per Minute of Different Staff Types**

<b>Staff</b>	<b>Cost per Minute</b>
Medical professional	\$0.56
Licensed outreach specialist	\$0.39
Non-licensed outreach specialist	\$0.37
Paraprofessional	\$0.30

The length of an outreach encounter also affects costs, as longer encounters require more staff time. Therefore, to assess the total cost of staff involvement in each encounter, the salary per minute was multiplied by the length of the encounter.

#### *Contact*

There were considerable costs associated with the location of the encounter. For example, if the encounter was implemented face-to-face, the program had to pay to transport either the outreach worker or the participant. Such travel costs varied greatly between sites. For example, because Detroit has poor public transportation, Wayne State provided a taxi service to its participants. In contrast, sites in the District of Columbia and New York City simply gave participants a \$4 subway pass for each trip. Additionally, some sites used their own vans to pick up participants, meaning that the costs of the vehicle, gasoline, and a driver were also considered. Wayne State spent approximately \$14,000 during 2004 and 2005 on van services. Review of their budgets found that the seven sites spent approximately \$40,000 on participant transport during 2004 and 2005. Because there were over 3,000 face-to-face encounters, an estimated \$13 was spent on

each encounter made in person. Encounters not conducted face-to-face also incurred a cost, albeit smaller due to expenses such as telephone, postage, and Internet service. For each non face-to-face encounter, sites spent approximately \$1.

### *Purpose*

Accompanying a participant to his/her appointment was the only purpose category that incurred a cost. Based upon the calculations above, assuming the cost to transport one person is \$13 (for a face-to-face contact), it follows that the cost to transport two people (outreach worker and participant) to an appointment would be \$26. A cost of zero for the other categories was assigned for two reasons. First, since costs were limited to those incurred at the time of the encounter, past investments made in staff training were not included.<sup>9</sup> Furthermore, the costs associated with ancillary services were not included because these were often not covered by the SPNS grantees. Partnerships were frequently formed with other programs or organizations to provide these additional supports to participants.

### *Total Cost of Each Encounter Type*

After assigning costs to encounter characteristics within each of the four characteristics, the total cost of different outreach encounter strategies was calculated, using the following formula:

$$\begin{aligned} \text{Total cost per encounter} = \\ & (\text{cost per minute of staff implementer} * \text{duration}) + \text{cost of point of contact} \\ & + \text{cost of purpose} \end{aligned}$$

A comparison of Table 2.1 and Table 3.12 demonstrates that sites tended to implement the least expensive encounter types. Thirty-eight percent of encounters were less than 15 minutes and conducted by non-licensed outreach workers who provided non face-to-face appointment logistical support. Face-to-face activities were more costly, due to increased dedication of personnel hours (face-to-face contacts tended to be longer) and transportation costs. The most expensive encounter type cost \$57 because it involved medical professionals accompanying participants to their appointment. This encounter type was only implemented 15 times.

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<sup>9</sup> Most likely, grantees trained staff to make referrals, handle logistics, and build relationships.

**Table 3.12: Costs of Outreach Encounter Types**

<b>Encounter Type</b>	<b>Staff</b>	<b>Duration (mins)</b>	<b>Contact</b>	<b>Purpose</b>	<b>Cost</b>
1	Licensed outreach worker	<15	Not face-to-face	Other	\$4.51
2	Non-licensed outreach worker	<15	Not face-to-face	Other	\$4.33
3	Non-licensed outreach worker	<15	Face-to-face	Other	\$16.33
4	Paraprofessional	<15	Not face-to-face	Other	\$3.70
5	Non-licensed outreach worker	15-30	Not face-to-face	Other	\$12.10
6	Non-licensed outreach worker	15-30	Face-to-face	Other	\$24.10
7	Medical professional	30+	Face-to-face	Other	\$57.24
8	Non-licensed outreach worker	30+	Face-to-face	Other	\$37.70
9	Non-licensed outreach worker	30+	Face-to-face	Accompany	\$54.25
10	Paraprofessional	30+	Face-to-face	Other	\$36.70
11	Miscellaneous				

## 4 DISCUSSION AND RECOMMENDATIONS

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The use of medical professionals in outreach improved appointment attendance, while frequent encounters improved HAART use. However, these findings should be considered along with the limitations of the analysis. Most importantly, only two grantees, University of Miami and Well-Being, implemented encounters with medical professionals (see Appendix B for staff breakdown by grantee). Therefore, improvements in appointment attendance may be attributable to other unique characteristics of these grantees, such as the targeting of at-risk women or use of hospital in-reach strategies.<sup>10</sup> Although the analysis controlled for these grantee-specific characteristics by clustering, this method may not have been sufficient. Moreover, because the small number of cases led to the grouping of different types of medical professionals together, no conclusions may be drawn regarding whether it is more important to use, say, a physician, a nurse, or a physician's assistant.

In addition, even though the initiative's evaluation and technical assistance center (ETAC) developed standardized instruments for data collection, some inconsistency in data collection is inevitable across seven grantee sites, especially with regard to capturing outreach encounter characteristics. The analysis attempted to mitigate these inconsistencies by grouping encounter characteristics into broader categories (see Appendix B for these groupings). Finally, HAART use was determined through surveys, which don't always reflect actual client behavior. Self-reported data, though simple and inexpensive to measure, may not always be accurate because clients may be more concerned with providing the "right" answers than communicating their actual behavior.

Even taking into account these limitations, this analysis provides important insight for Ryan White grantees that encourage underserved populations with HIV/AIDS to seek continuous care. To maximize their limited funding, programs should consider two strategies: 1) occasional outreach encounters implemented by medical professionals and 2) frequent and less expensive outreach encounters conducted by other types of workers. While encounters with medical professionals may generate the trust necessary for patients to attend medical appointments, frequent encounters encourage patients to adhere to medication.

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<sup>10</sup> Because the University of Miami primarily utilized in-reach strategies, which involved contacting clients as they were admitted to the hospital, medical professionals may have been more readily accessible than in other programs. Well-Being, on the other hand, sent nurses to client homes to engage them in care.

### *Occasional Encounters with Medical Professionals Can Improve Appointment Attendance without Excessive Costs*

Medical professionals were found to have successfully encouraged their patients to attend medical appointments. Contact between patients and clinicians outside of the medical setting may generate the trust certain populations with HIV/AIDS need to seek care. Because medical professionals are the most expensive staff type, at almost twice the cost of paraprofessionals, programs should consider using them sparingly. Programs might consider implementing these types of encounters at the beginning of the program to create a solid relationship early on. This recommendation may have different implications for different grantees. It may be easier for grantees in clinical settings to utilize medical professionals for outreach.

### *Frequent, Less Expensive Outreach Encounters Can Encourage HAART Use*

Although this analysis did not assess levels of HAART adherence, it did find that less expensive encounters were related to self-reported HAART use. Therefore, to improve HAART use, programs should implement the least expensive encounters frequently. These encounters, implemented continuously throughout the program, may remind people with HIV/AIDS to take their medications. Less expensive encounters include phone calls, appointment reminder cards, and short sessions with paraprofessionals.

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## APPENDIX A PROGRAM DESCRIPTION

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**Table A.1: Characteristics of the 644 Participants**

<b>Characteristic</b>	<b>Percentage</b>
Age	
15-24 years	16%
25 - 39 years	32%
40-54 years	45%
55+ years	7%
Gender	
Female	41%
Male	59%
Ethnicity	
African-American, Non-Hispanic	57%
Latino, Other	27%
Caucasian, Non-Hispanic	16%
Education	
HS† education	36%
Post-HS education	32%
Less than HS education	32%
Unstable living situation	33%
Drug use	
Binge alcohol or drug use 30 days prior to intake	44%
Mental health problem	66%
Caregiver for child, elder, or person with AIDS	22%
Has case manager	58%
Insurance	
Private	5%
Public	625
CD4 count	
<200	32%
200-349	27%
350+	41%
High satisfaction w/provider	47%
Married or in committed relationship	28%

**Table A.2: Program Characteristics**

<b>Grantee</b>	<b>Target Population</b>	<b>Referral Partners/Strategies</b>	<b>Key Intervention Strategies</b>
Cascade	People who suffer from mental illness, substance abuse, low socio-economic status, and homelessness; Latinos with cultural and language barriers	Received referrals from: HIV/AIDS testing sites HIV/AIDS primary care clinics County Corrections medical unit HIV/AIDS case management program	Coordinated with HIV/AIDS case workers to identify participants at risk of falling out of care Employed motivation interviewing techniques to assess participant needs and barriers to care
Fenway	Drug injection users, ex-incarcerated individuals, sex-workers, and men who have sex with men	Received referrals from: Substance abuse treatment program Social service center Community-based AIDS service organization	Met participants at home or service agencies and accompanied them to medical and ancillary service appointments Helped participants overcome language barriers, do paperwork, and advocate for services Coordinated referrals for ancillary services
Well-Being (WB)	Poor women of color, often with histories of substance abuse and mental illness	Selected at-risk Detroit Medical Center patients through an algorithm that measured participants' risk of falling out of care.	Visited participants in their homes to educate them on HIV/AIDS and treatments Accompanied participants to their medical appointments
Whitman-Walker (WW)	People of color, with history of incarceration, and recovering from addiction	Developed a screening tool to refer patients to the intervention. This tool was applied during intake at WW medical clinics.	Discussed with new participants the program and services offered Provided reminder phone calls the day before appointments Arranged transportation or child care
Wayne State (WS)	Youth	Received referrals from Detroit Medical Center	Implemented a four-session motivational intervention Conducted motivational interviewing

<b>Grantee</b>	<b>Target Population</b>	<b>Referral Partners/Strategies</b>	<b>Key Intervention Strategies</b>
University of Miami (UM)	Women; pregnant and non pregnant	Received referrals from the University of Miami's Jackson Memorial Medical Clinic	Conducted intensive, scripted four-session (two face-to-face and two by telephone) interventions Interventions focused on problem-solving skills, HIV/AIDS education, and motivational enhancement
Drew/UCLA	Previously undiagnosed HIV/AIDS-positive individuals (commercial sex workers, runaway youth, homeless, undocumented workers, teen parents, men who have sex with men of color and transgender and transsexual persons)	Received referrals from: Local CBOs and medical clinics Harbor/UCLA Medical Center	Evaluated the effectiveness of a mobile HIV/AIDS testing van in engaging people into primary health care Evaluated the effectiveness of strategies used to retain people in care

## APPENDIX B ENCOUNTER CHARACTERISTICS

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Appendix B presents how the outreach encounter characteristics were classified and the frequencies in which they were implemented across grantees.

**Table B.1: Classification of Staff Type**

<b>Medical Professional</b>	Mental Health Clinicians
	Nurse Practitioner
	Physician Assistant
	Physician
	Nurse
<b>Licensed Outreach Specialist</b>	Case Manager
	Social Worker
	Substance Abuse Counselor
<b>Non Licensed Outreach Worker</b>	Non-Peer Outreach Worker
<b>Paraprofessionals</b>	Peer Worker
	Administrative staff
	Participant Volunteer
	Staff Volunteer

Grantees tended to use the less expensive staff types. The vast majority of outreach encounters were implemented by non-licensed outreach workers, followed by paraprofessionals. Although the overall frequency of medical professionals was low, two sites, Well-Being and University of Miami used this type of staff relatively often. Four of the seven sites predominately used one type of staff, while the remaining sites had a more diverse outreach team. Well-Being had the most diverse staff with an almost even mix of medical professionals, non-licensed outreach workers, and paraprofessionals.

**Table B.2: Frequencies of Staff Type**

<b>Grantee</b>	<b>Medical Professional</b>	<b>Licensed Outreach Worker</b>	<b>Non-licensed Outreach Worker</b>	<b>Para-professional</b>
<b>Overall Mean</b>	<b>4%</b>	<b>8%</b>	<b>71%</b>	<b>16%</b>
Cascade	0%	0%	79%	22%
Fenway	0%	0%	99%	2%
WB	31%	0%	24%	45%
WW	0%	0%	100%	0%
WS	0%	0%	0%	100%
UM	74%	0%	0%	26%
Drew/UCLA	0%	99%	0%	1%

The majority of encounters were less than 15 minutes. University of Miami, Fenway, and Cascade tended to conduct longer encounters. Fifty three percent of Cascade’s encounters were more than 15 minutes, which is interesting considering that the grantee implemented over 1,500 outreach encounters. Only Whitman-Walker implemented more encounters than Cascade (5,644), while the other grantees had an average of approximately 700 encounters.

**Table B.3: Frequencies of Encounter Duration**

<b>Grantee</b>	<b>Less than 15 minutes</b>	<b>Between 15 and 30 minutes</b>	<b>More than 30 minutes</b>
<b>Overall Mean</b>	<b>72%</b>	<b>11%</b>	<b>17%</b>
Cascade	47%	23%	29%
Fenway	54%	27%	19%
WB	61%	16%	23%
WW	81%	7%	12%
WS	81%	1%	17%
UM	56%	6%	38%
Drew/UCLA	83%	10%	7%

Almost 70 percent of encounters were conducted by phone or through mail or email; however, there was large variation among sites. Whereas Cascade implemented almost 60 percent of its contacts in person, only 12 percent of Drew/UC’s contacts were face-to-face.

**Table B.4: Frequencies of Face-to-face Encounters**

<b>Grantee</b>	<b>% of Face-to-face Encounters</b>
<b>Overall Mean</b>	45%
Cascade	63%
Fenway	44%
WB	31%
WW	45%
WS	39%
UM	44%
Drew/UCLA	16%

**Table B.5: Classification of Purpose**

<b>Other</b>	Provide information about program
	Provide information about HIV medications
	Refer to needle exchange
	Provide general HIV education
	Refer to substance abuse treatment
	Perform participant needs assessment
	Provide harm reduction supplies
	Provide assistance with benefits/entitlements
	HIV or STD testing
	Provide concrete services
	Provide medical services
	Provide mental health counseling
	Relationship building
	Provide other counseling
	Provide specific HIV risk reduction/counseling
	Provide crisis intervention
	Refer to or make appointment for health care
	Refer to or make appointment for mental health care
	Advocate for participant
	Refer to or make appointment for dental services
Refer to or make appointment for housing services	
Refer to or make appointment for other services	
Provide service coordination	
<b>Accompany</b>	Accompany participant to other appointment
	Accompany participant to medical appointment

The vast majority of outreach encounters were classified as “Other” with only 16 percent of encounters involving a participant being accompanied to an appointment. Most of these “Accompany” encounters were implemented by Whitman-Walker.

**Table B.6: Frequencies of Encounter Purposes**

	<b>Other</b>	<b>Accompany</b>
<b>Overall Mean</b>	<b>70%</b>	<b>16%</b>
Cascade	42%	2%
Fenway	73%	1%
WB	64%	2%
WW	84%	10%
WS	86%	0%
UM	87%	0%
Drew/UCLA	15%	0%

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