



# Atrium Health

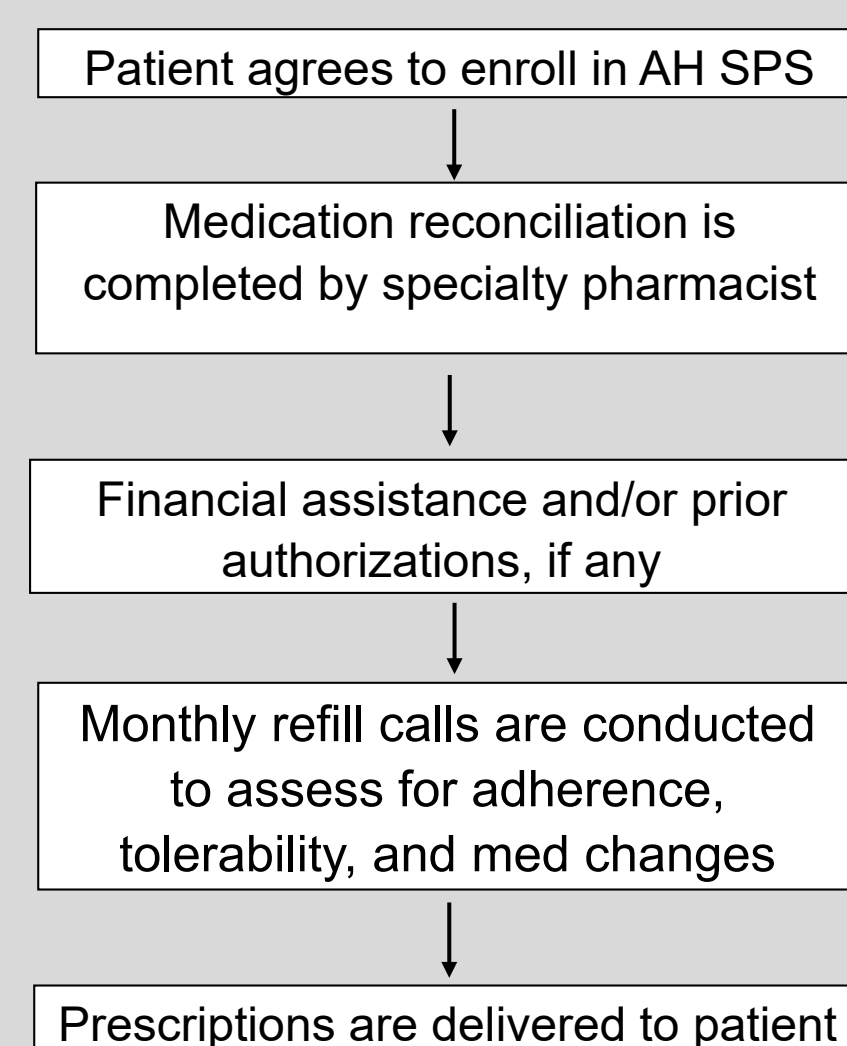
# The Impact of an Integrated Health-System Specialty Pharmacy on HIV Antiretroviral Therapy Adherence, Viral Suppression, and CD4 Count in an Outpatient ID Clinic

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## Introduction

HIV continues to be a serious health issue in the U.S. However, the Southern states experience the greatest burden of HIV infection with an estimated 46% of all HIV-infected patients residing within this region. The Charlotte Metropolitan area is ranked 25<sup>th</sup> in the nation for HIV annual case rates and 10<sup>th</sup> in the Southern U.S. Charlotte-based health-system, Atrium Health (AH), currently cares for over 5,000 HIV-infected patients across 6 different counties through 3 urban outpatient ID clinics. A key component in helping alleviate the burden of HIV in the South, is to ensure that patients are adherent to their treatment regimens. Nearly all patients who adhere to ARV therapy at a rate of 90% or greater are able to achieve and maintain viral suppression which is critical to restoring immune function, improving survival, preventing the development of resistance, and reducing transmission to sexual partners. Clinical pharmacists, as experts in medication management, can play a key role in helping to promote and assist with adherence. AH Specialty Pharmacy Service (SPS) recognized the need to connect the patient, provider, pharmacist, and pharmacy at the point of care in order to improve clinical outcomes for these patients. As a result, a 2-person specialty team consisting of an HIV clinical pharmacist and pharmacy technician were embedded within the AH Myers Park ID clinic in August 2017 to offer specialty pharmacy services.

Figure 1. Atrium Health Specialty Pharmacy Service Practice Model



### Objectives:

- The **primary objective** was to evaluate the antiretroviral medication adherence rate of patients that utilize AH SPS.
- Main patient-centered clinical endpoints included: (1) the number of patients with a suppressed viral load of < 20 copies/ml, and (2) number of patients with CD<sub>4</sub> counts of 200 or greater.
- The intervention group (opt-in group) was defined as HIV patient care that utilized our health-system specialty pharmacy service. The control group (opt-out group) was defined as HIV patient care that did not utilize our health-system specialty pharmacy.
- Within group comparisons from baseline to follow-up were made as well as group-to-group comparisons.

### Methods:

- Single-center, retrospective cohort study conducted from August 7<sup>th</sup>, 2017 to June 30<sup>th</sup>, 2018.
- Prescription refill history was reviewed through pharmacy claim data from the date of entry or declination to program up to the end of the follow up (June 30<sup>th</sup>, 2018).
- Adherence rate was calculated using the calculation for Medication Possession Ratio (MPR). For collection of non-integrated external pharmacy refill data, manual phone calls were made to each pharmacy to inquire about refill histories. For purposes of this evaluation, refill history includes the date the prescription was filled.
- Baseline viral load and CD<sub>4</sub> count at time of entry or declination to the program was recorded as well as at the end of the observation period.

## Results

### Baseline Characteristics

- Male vs female ratios were similar in each group; with a slightly older population in the opt-out group.
- In terms of race, there were more black patients within the opt-out group.
- No statistically significant difference in regimen complexity (number of tablets/day).
- Number of pts with psychiatric diagnoses and/or substance abuse disorders were similar.
- Overall, most patients had either Medicare or Medicaid as their payor source (vs commercial insurance)

### Adherence Rates

- For those patients using AH SPS, the median Medication Possession Ratio (MPR) was higher at 100% versus only 94% for those patients that opted out of the service (P < 0.01).**
- The total number of patients within the opt-in group with an MPR of 90% or greater was significantly higher when compared with the opt-out group (89.1% vs. 64.0%, P < 0.01).

Table 2. Medication Possession Ratio by Opt-out and Opt-in groups

	Opt-in group (N=46)	Opt-out group (N=50)	P value
≥90%	41 (89.1%)	32 (64.0%)	<0.01 <sup>a</sup>
<90%	5 (10.9%)	18 (36.0%)	
Median [P25, P75]	1.00 [0.99,1.00]	0.94 [0.82,0.99]	<0.01 <sup>b</sup>

P values: a= Fisher's exact test, b= Wilcoxon-Mann Whitney test.

### CD4 Count

- Within the opt-in group, of the 6 patients that had CD<sub>4</sub> counts < 200 at baseline, all but one had improved immune function with a CD<sub>4</sub> count 200 or greater by the end of the observation period (p = 0.03, **Table 3 & Figure 1**).
- There was no improvement in immune function of the 3 patients with CD<sub>4</sub> counts < 200 at baseline within the opt-out group.
- By the end of the observation period, the number of patients with weakened immune function as demonstrated by CD<sub>4</sub> < 200 increased from 3 to 4 patients.
- No statistically significant difference in meeting the end-point of CD<sub>4</sub> 200 or greater when the group-to-group comparison was made.

Figure 2. Viral load suppression and CD4 by Opt-out and Opt-in groups

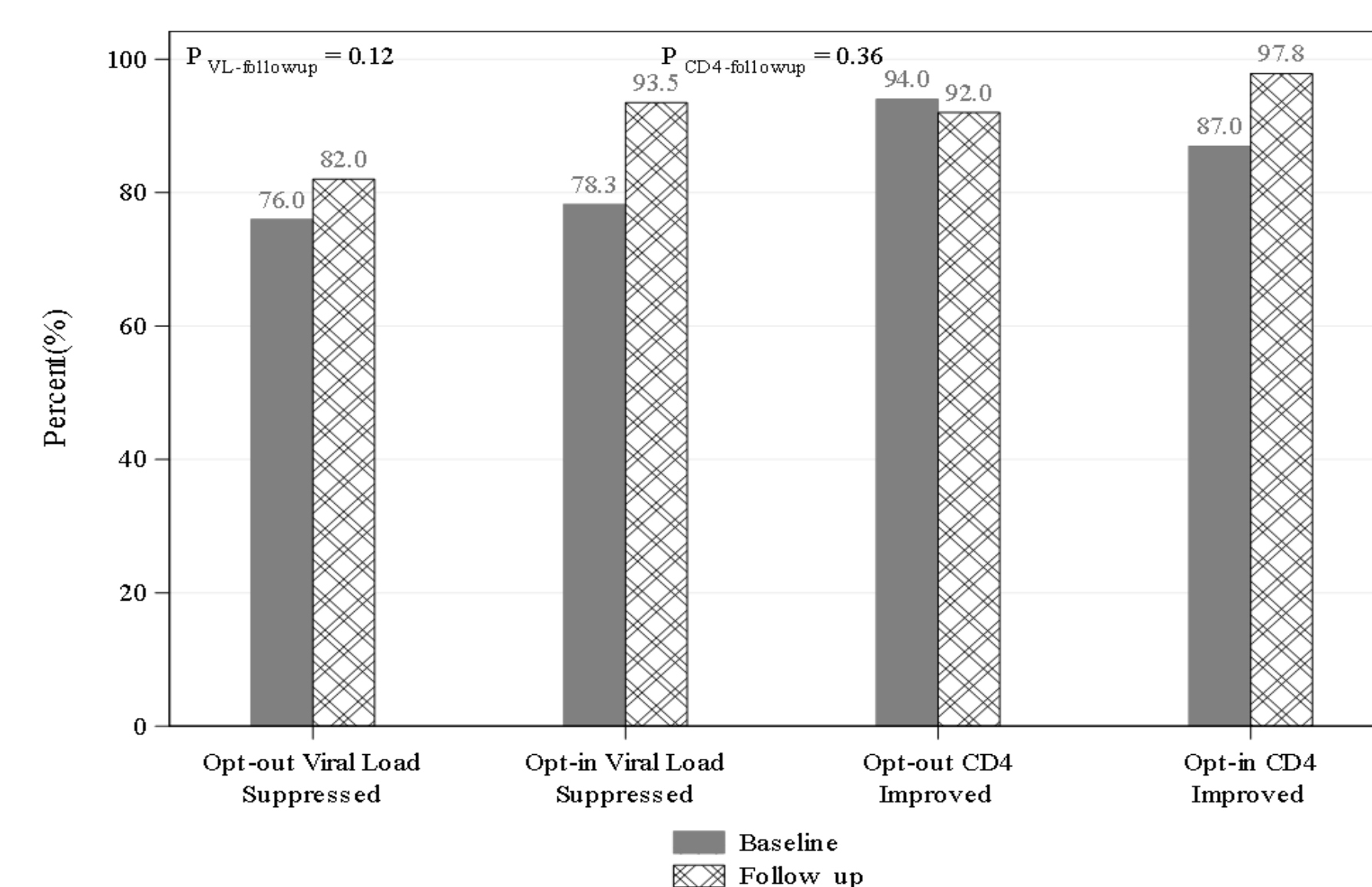


Table 1. Baseline patient characteristics

	Opt-in group (N=46)	Opt-out group (N=50)	P value
Age	53.7±12.9	58.5±9.4	0.04 <sup>a</sup>
Sex			0.30 <sup>b</sup>
Female	22 (47.8%)	18 (36.0%)	
Male	24 (52.2%)	32 (64.0%)	
Race			0.03 <sup>b</sup>
White	6 (13.0%)	2 (4.0%)	
Black	37 (80.4%)	48 (96.0%)	
Other	3 (6.5%)	0 (0.0%)	
Insurance Status			0.23 <sup>b</sup>
Commercial	9 (19.5%)	5 (10.0%)	
Medicaid	8 (17.4%)	17 (34.0%)	
Medicare only	4 (8.7%)	11 (22.0%)	
Medicare + Medicaid	25 (54.3%)	17 (34.0%)	
Education			0.28 <sup>c</sup>
Incomplete high school	16 (34.8%)	22 (44.0%)	
High School or GED	12 (26.1%)	16 (32.0%)	
Some college or higher	18 (39.1%)	12 (24.0%)	
Substance abuse			0.63 <sup>c</sup>
No	33 (71.7%)	38 (76.0%)	
Yes	13 (28.3%)	12 (24.0%)	
Psychiatric diagnosis			0.94 <sup>c</sup>
No	30 (65.2%)	33 (66.0%)	
Yes	16 (34.8%)	17 (34.0%)	
Type of regimen			0.48 <sup>b</sup>
INSTI	33 (71.7%)	32 (64.0%)	
PI	4 (8.7%)	6 (12.0%)	
NNRTI	4 (8.7%)	2 (4.0%)	
Other	5 (10.9%)	10 (20.0%)	
Number of pills in regimen			0.71 <sup>c</sup>
1	25 (54.3%)	23 (46.0%)	
2	9 (19.6%)	11 (22.0%)	
>=3	12 (26.1%)	16 (32.0%)	

P values: a= t-test, b= Fisher's exact test, c= Pearson's chi-square test.

### Viral Load

- Within the opt in group, 10 of the 46 patients had a detectable viral load of 20 copies/ml or greater at baseline.
- By observation period end, all but 3 reached viral suppression of < 20 copies/ml (21.7% at the baseline vs. 6.5% at the follow up, p value = 0.03, **Table 3 & Figure 1**).
- Of the 3 patients that did not reach viral suppression, all had viral loads < 200 copies/ml.
- At baseline within the opt-out group, 12 out of 50 patients had a detectable viral load of 20 copies/ml or greater.
- Only 3 of these 12 patients reached viral suppression by the end of the observation period (p = .41).
- For the 9 remaining patients that did not reach viral suppression, 4 had viral loads of 200 copies/ml or greater.
- No statistically significant difference in meeting the end-point of viral suppression with < 20 copies/ml when the group-to-group comparisons were made.

Table 3. Clinical Outcomes by Opt-out and Opt-in groups

	Opt-in (N=46)		P <sup>a</sup>	Opt-out (N=50)		P <sup>a</sup>
	Baseline	Follow-up		Baseline	Follow-up	
Viral load						
<20	36 (78.3%)	43 (93.5%)		38 (76.0%)	41 (82.0%)	
≥20	10 (21.7%)	3 (6.5%)	0.03	12 (24.0%)	9 (18.0%)	
CD4						
<200	6 (13.0%)	1 (2.2%)		3 (6.0%)	4 (8.0%)	
≥200	40 (87.0%)	45 (97.8%)	0.03	47 (94.0%)	46 (92.0%)	

<sup>a</sup>: Using McNemar's test within groups

## Conclusion

- Our integrated health-system specialty pharmacy made a meaningful clinical impact upon HIV-infected patients using our services.
- AH SPS provided high touch support to enrolled patients by proactively offering medication refills, identifying and managing drug interactions, assisting with side effect management and addressing any barriers to adherence.
- Our program identified a statistically significant improvement adherence to ART with the involvement of an integrated health-system specialty pharmacy in patient care.
- Viral suppression rates and immune markers were also significantly improved from baseline to follow-up for those enrolled in our service.
- While the difference between the opt-in and opt-out patients in reaching the clinical endpoints of viral suppression and improved immune function did not meet statistical significance – this may be due in part to the small sample size.
- Ultimately, this demonstrates that a health-system specialty pharmacy service can help to improve the HIV care continuum and should be incorporated into the standard of practice for providing care in this patient population. In the future, AH SPS would like to further evaluate the impact an integrated health-system specialty pharmacy service has upon clinic appointment attendance, hospital admissions, long term survival and opportunistic infection rates.

## Acknowledgements

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## Contact Info

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## Resources

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