

Healthcare Resource Utilization and Cost Among Treatment-Experienced People Living with HIV Switching to Single Tablet Regimen or Multi-tablet Regimen Triple Therapy Since 2018

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Background

- Approximately 28.7 million people living with HIV (PLWH) receive antiretroviral (ARV) treatment worldwide.¹
- Single tablet regimens (STR) combine fixed-dose combination therapy into a single dosing unit administered once daily, while multiple tablet regimens (MTR) require multiple dosing times or units per day.
- Due to the simpler dosing schedule and lower pill burden, patients treated with STR tend to be more adherent, have a higher quality of life, and contribute lower costs to the healthcare system than those on MTR.²⁻⁶
- Current HIV treatment guidelines recommend an integrase strand transfer inhibitor (INSTI) in combination with two non-nucleoside reverse transcriptase inhibitors (NNRTIs) for ARV treatment of PLWH.^{7,8}
- Little is known about the economic burden of treatment-experienced PLWH switching to STR and MTR triple therapies.
- It was anticipated that in a switch population, patients with differing severity and intensity of resource needs will be channeled unequally between therapies; therefore, it was necessary to utilize statistical techniques such as inverse probability treatment weighting (IPTW) to control for as many baseline differences as possible.

Objective

- This study analyzed healthcare resource utilization and costs among treatment-experienced PLWH who initiated STR or MTR triple therapy.

Methods

- A retrospective cohort study was performed using administrative claims data for commercial and Medicare Advantage health plan enrollees in the Optum Research Database.
- To be included in the study, patients must have met all criteria:
 - ≥1 non-diagnostic medical claim with a diagnosis code for HIV during the baseline or first 3 months of the follow-up period; non-diagnostic claims were required as diagnostic claims generally include diagnoses from laboratory tests, pathology, and imaging and may be indicative of a rule-out diagnosis
 - ≥1 pharmacy claim for triple ARV therapy from January 01, 2018 – December 31, 2019 (identification period); the date of the first claim for the regimen was the index date
 - Continuously enrolled in the health plan for ≥12 months prior to (baseline period) and ≥3 months following (follow-up period) the first claim for an INSTI-based regimen
 - ≥1 line of ARV therapy prior to the start of triple therapy
 - ≥18 years of age as of the first triple therapy claim
 - No medical claims for HIV-2 or pharmacy claims for pre- or post-exposure prophylactic therapy
- Measures
 - Baseline patient demographics and clinical characteristics
 - Healthcare resource utilization: all-cause and HIV-related utilization were calculated per patient per month (PPPM) for ambulatory visits (office and outpatient), emergency room visits, inpatient stays, and pharmacy fills; utilization was considered HIV-related if the claim included diagnosis codes for HIV or AIDS-defining conditions.
 - Healthcare costs: all-cause and HIV-related healthcare costs were computed as the PPPM sum of health plan and patient paid amounts; healthcare costs included pharmacy costs plus medical costs (ambulatory, emergency room, inpatient hospitalization, and other medical costs [independent laboratory, home health, durable medical equipment]); costs were adjusted to 2019 US dollars; HIV-related costs were defined as those that included ARV therapy or a claim or diagnosis code for HIV or AIDS-defining conditions.
- Analyses
 - IPTW was conducted to control for differences in baseline demographic and clinical characteristics.
 - Statistical testing (Rao-Scott test for binary measures, Z-test with robust standard errors for continuous measures) was performed to compare STR to MTR both overall and among those initiating guideline-recommended INSTI-based regimens.

Results

- A total of 7,456 treatment-experienced PLWH were identified; 87% (n = 6,505) had STR and 13% (n = 951) had MTR triple therapy (Table 1).
- A total of 4,251 (57.0%) patients initiated guideline-recommended INSTI-based triple therapy regimens; 85% (n = 3,625) STR and 15% (n = 626) MTR.
- After IPTW, baseline characteristics were well balanced between STR and MTR cohorts.
 - Mean age was 52 years, the majority were male (82% overall, 84% INSTI-based regimens) approximately 66% had commercial insurance, and around 60% lived in the South.

Table 1. IPTW Baseline Demographic and Clinical Characteristics

	Overall (n = 7,456)	STR (n = 6,505)	MTR (n = 951)
All Regimens			
Age, mean (SD)	52.0 (12.9)	52.0 (12.9)	52.1 (12.7)
Male, n (%)	6,109 (81.9)	5,335 (82.0)	774 (81.4)
Region, n (%)			
Northeast	961 (12.9)	841 (12.9)	120 (12.6)
Midwest	1,001 (13.4)	876 (13.5)	125 (13.1)
South ¹	4,518 (60.6)	3,941 (60.6)	578 (60.8)
West	976 (13.1)	847 (13.0)	129 (13.5)
Commercial insurance, n (%)	4,946 (66.3)	4,332 (66.6)	615 (64.7)
Charlson comorbidity score, ² mean (SD)	0.9 (1.5)	0.9 (1.5)	0.9 (1.5)
Baseline all-cause healthcare costs, mean (SD)	44,768 (53,760)	44,271 (51,586)	48,172 (66,693)
Baseline HIV-related healthcare costs, mean (SD)	35,537 (35,685)	35,256 (36,610)	37,455 (28,509)
INSTI-based Regimens			
Valid n	4,251	3,625	626
Age, mean (SD)	52.3 (12.8)	52.2 (12.8)	52.6 (12.7)
Male, n (%)	3,564 (83.9)	3,042 (83.9)	523 (83.5)
Region, n (%)			
Northeast	566 (13.3)	482 (13.3)	83 (13.3)
Midwest	589 (13.9)	504 (13.9)	85 (13.5)
South ¹	2,502 (58.8)	2,135 (58.9)	367 (58.7)
West	594 (14.0)	504 (13.9)	91 (14.5)
Commercial insurance, n (%)	2,786 (65.5)	2,388 (65.9)	398 (63.7)
Charlson comorbidity score, ² mean (SD)	0.9 (1.6)	0.9 (1.6)	0.9 (1.6)
Baseline all-cause healthcare costs, mean (SD)	47,366 (54,047)	47,528 (55,937)	46,427 (41,473)
Baseline HIV-related healthcare costs, mean (SD)	37,631 (39,917)	37,642 (41,429)	37,571 (29,706)

¹Includes patients in other/unknown regions. ²Modified comorbidity score was calculated based on the presence of diagnosis codes on medical claims after excluding HIV/AIDS in the calculation.

PPPM, per patient per month

Results (cont'd)

Healthcare Resource Utilization – All Regimens

- After IPTW, PLWH treated with STR had significantly fewer ambulatory visits than those treated with MTR (0.5 vs 0.6, p<0.001) (Table 2).
- PLWH treated with STR also had fewer all-cause and HIV-related (p<0.001) pharmacy fills than those treated with MTR.

Table 2. IPTW PPPM Healthcare Resource Utilization – All Regimens

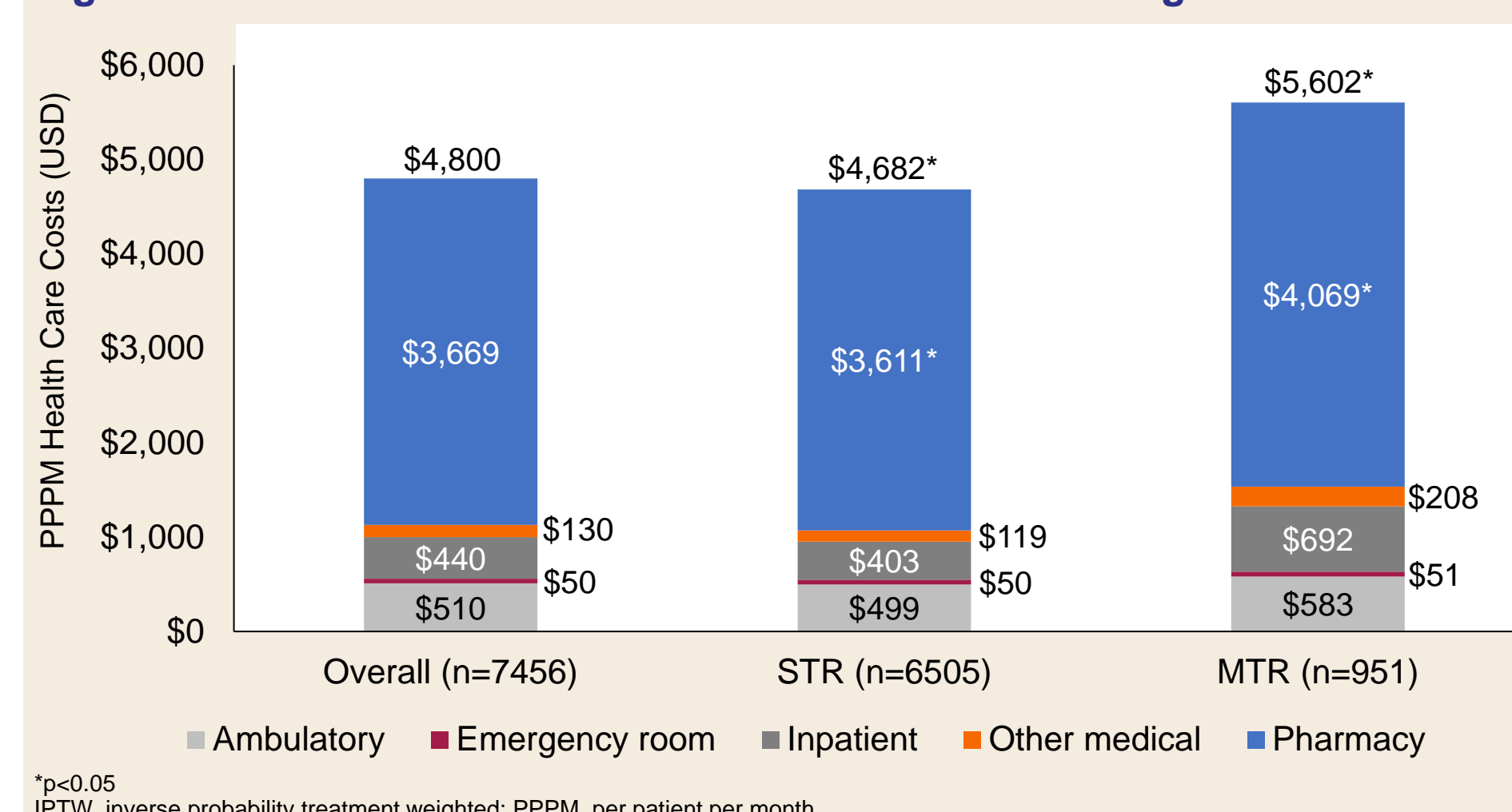
	Overall (n = 7,456)	STR (n = 6,505)	MTR (n = 951)
All-cause Utilization			
Ambulatory Visit, n (%)	6,846 (91.8)	5,983 (92.0)	863 (90.8)
mean (SD)	1.5 (2.0)	1.5 (2.0)	1.7 (2.3)
Emergency Room Visit, n (%)	2,157 (28.9)	1,872 (28.8)	285 (29.9)
Mean (SD)	0.1 (0.3)	0.1 (0.3)	0.1 (0.3)
Inpatient Stay, n (%)	714 (9.6)	625 (9.6)	89 (9.4)
Mean (SD)	0.02 (0.1)	0.02 (0.1)	0.02 (0.1)
Pharmacy Fills, mean (SD)	3.5 (2.9)	3.4 (2.8)*	4.6 (3.0)*
HIV-related Utilization			
Ambulatory Visit, n (%)	6,341 (85.0)	5,549 (85.3)	792 (83.3)
mean (SD)	0.5 (0.8)	0.5 (0.7)*	0.6 (1.1)*
Emergency Room Visit, n (%)	1,186 (15.9)	1,034 (15.9)	152 (16.0)
Mean (SD)	0.04 (0.2)	0.04 (0.2)	0.04 (0.2)
Inpatient Stay, n (%)	680 (9.1)	592 (9.1)	88 (9.3)
Mean (SD)	0.02 (0.1)	0.02 (0.1)	0.02 (0.1)
Pharmacy Fills, mean (SD)	1.1 (0.5)	0.9 (0.3)*	2.0 (0.6)*

*p<0.05
IPTW, inverse probability treatment weighted; PPPM, per patient per month

All-cause Healthcare Costs – All Regimens

- Following IPTW, mean all-cause total costs were significantly lower for PLWH treated with STR versus MTR (\$4,682 vs \$5,602, p<0.001) (Figure 1).
- All-cause total costs were lower due to significantly lower pharmacy costs for STR vs MTR (\$3,611 vs \$4,069, p<0.001).
- Ambulatory costs (\$499 vs \$583, p = 0.165) and inpatient costs (\$403 vs \$692, p = 0.111) were numerically lower for STR vs MTR, but not statistically significant.
- Pharmacy costs accounted for 76% of the total all-cause costs.

Figure 1. IPTW PPPM All-cause Healthcare Costs – All Regimens

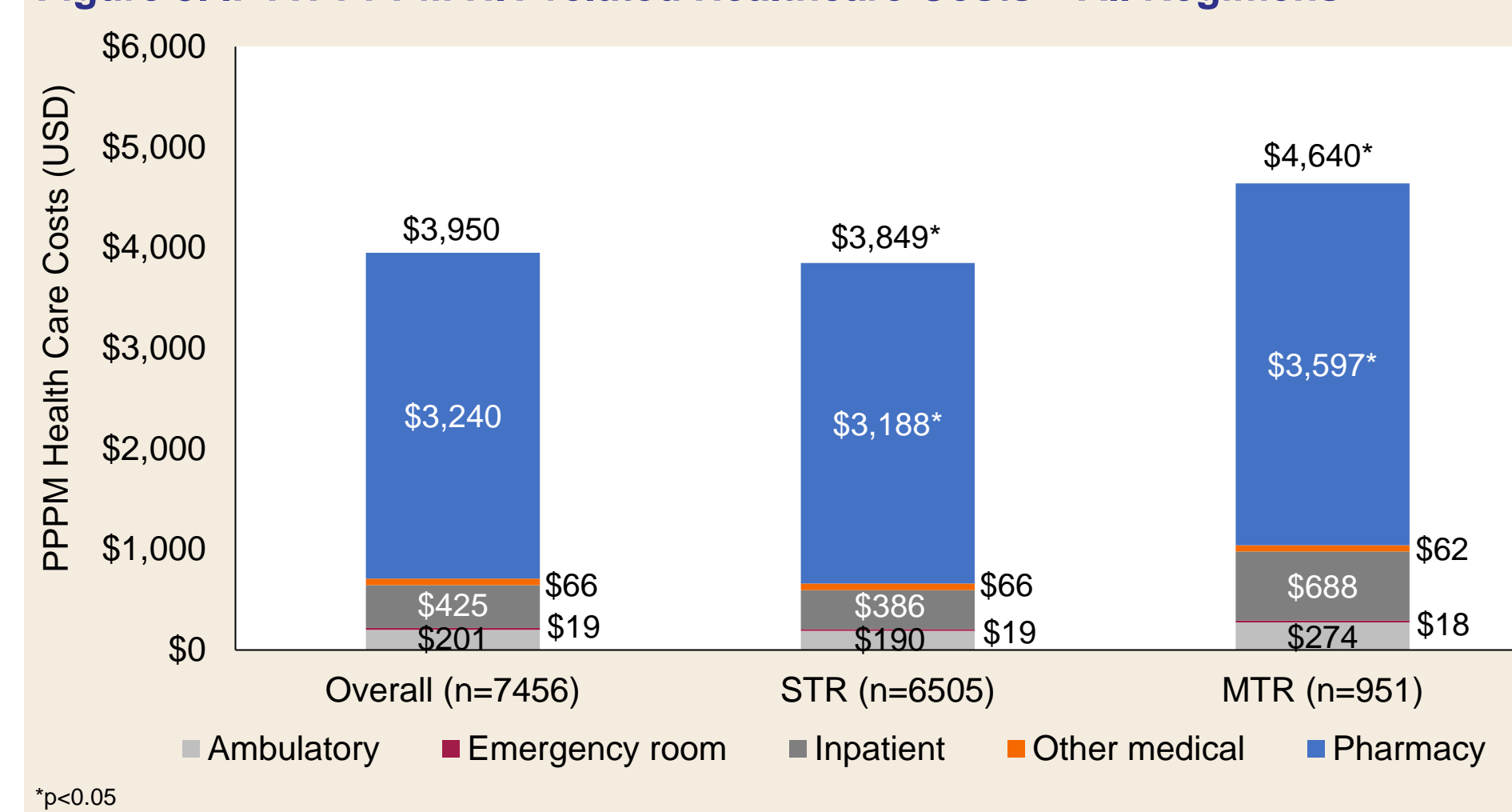


*p<0.05
IPTW, inverse probability treatment weighted; PPPM, per patient per month

HIV-related Healthcare Costs – All Regimens

- Following IPTW, mean HIV-related total costs were significantly lower for PLWH treated with STR versus MTR (\$3,849 vs \$4,640, p<0.001) (Figure 3).
- HIV-related total costs were lower due to significantly lower pharmacy costs for STR vs MTR (\$3,188 vs \$3,597, p<0.001), which accounted for 82% of total HIV-related costs.
- Ambulatory costs (\$190 vs \$274, p = 0.052) and inpatient costs (\$386 vs \$688, p = 0.096) were numerically lower for STR vs MTR and trended towards significance.
- HIV-related costs for all regimens accounted for 82% of all-cause total costs.

Figure 3. IPTW PPPM HIV-related Healthcare Costs – All Regimens



*p<0.05
IPTW, inverse probability treatment weighted; PPPM, per patient per month

Limitations

- PLWH were primarily covered by commercial insurance, and results may differ for Medicaid and Medicare populations.
- The geographic spread of PLWH was skewed towards the South.

Conclusions

- PLWH treated with STR had significantly lower all-cause and HIV-related healthcare costs, driven primarily by higher pharmacy costs among patients treated with MTR.
- Selecting the appropriate treatment regimen may help patients maintain lower health care costs.

References: 1. World Health Organization. HIV Fact Sheet 2022. www.who.int/news-room/fact-sheets/detail/hiv-aids. 2. Astuti N, et al. *Infect Dis Ther*. 2014; 3: 1-17. 3. Cohen CJ, et al. *BMJ Open* 2013; 3: e003028. 4. Colombo GL, et al. *Clinicoecon Outcomes Res*. 2013; 5: 489-496. 5. Colombo GL, et al. *Theor Clin Risk Manag*. 2014; 10: 9-15. 6. Beck EJ, et al. *PloS One*. 2012; 7: e47376. 7. US Department of Health and Human Services. Guidelines for the use of antiretroviral agents in adults and adolescents with HIV. https://clinicalinfo.hiv.gov/en/guidelines/hiv-clinical-guidelines-adult-and-adolescent-arv/conclusion/viewfull. 8. Saag MS, et al. *JAMA*. 2018; 320: 379-396.

Disclosures: Chastek B, Anderson A, and Webb N are employees of Optum; Rock M, Gruber J, Majethia S, and Zachry W are employees of Gilead; Cohen J is a principal investigator sponsored by Gilead Sciences; Colson A is principal investigator for clinical trials sponsored by Gilead Sciences, Janssen, and VIV/GSK Speakers Bureau member for (VIV/GSK), and a presenter of a product specific educational / user-experience video for VIV/GSK.