HEALTH CARE RESOURCE UTILIZATION AND COST OF PEOPLE LIVING WITH HIV (PLWH) IN US COMMERCIAL AND MEDICARE ADVANTAGE HEALTH PLANS

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Introduction

- Human immunodeficiency virus (HIV) infection continues to represent a significant healthcare burden in the United States
- The goal of HIV treatment is to achieve and maintain virologic suppression to prevent disease progression; a predictor of HIV disease progression is decreasing CD4 counts, which lead to worsening health[1]
- The objectives of this study were to describe the clinical characteristics, healthcare resource use (HCRU), and cost of PLWH in US health plans by CD4 strata

Methods

Study Design and Data Sources

- This retrospective cohort study used administrative claims from the National Optum Research Database (ORD) representing more than 70 million lives in the United States between July 1, 2013, and March 31, 2019 (study period), including medical and pharmacy claims, and enrollment information linked to socioeconomic and Social Security Administration death data

Patient Population

- Adult (≥18 years) commercial and Medicare Advantage health plan enrollees with ≥1 non-diagnostic medical claim for HIV-1 during the study period and ≥1 pharmacy claim for an antiretroviral therapy (ART) between January 1, 2014, and March 31, 2018 (ID period)
- Continuous enrollment 6 months before (baseline) and 12 months after (unless evidence of death sooner) the first ART regimen (follow-up) and CD4 test results recorded close to the first ART regimen
- Three mutually exclusive treatment cohorts were defined during the study period (Table 1); the index date was assigned to the first ART agent filled meeting the cohort criteria

Table 1. Cohort Identification Criteria

Cohort	Criteria
Heavily treatment experienced (HTE)	Any regimen typically reserved for PLWH at advanced stages of disease, including: dolutegravir BID, darunavir BID, enfuvirtide, etravirine plus maraviroc or one of the above, ≥2 core[a] agents plus any other ART
Treatment experienced (non-HTE)	Any antiviral core or backbone[b] not meeting HTE criteria
Treatment naive	No baseline ART; except emtricitabine/tenofovir alone

BID, twice daily. [a]Core included medications from the following ART classes: non-nucleoside reverse transcriptase inhibitors, protease, fusion or entry inhibitors, integrase strand transfer inhibitors, or any combinations of these. [b]Nucleoside/Nucleotide reverse transcriptase inhibitors.

Measures and Statistical Analysis

- Demographics, clinical characteristics, all-cause, and HIV-related HCRU and cost were assessed during the baseline and follow-up period. Mortality was assessed during follow-up
- All study measures were summarized by CD4 count strata, <200, 200-500, or >500 cells/mm^{3}
- Differences were assessed using chi-square or F-test/ANOVA

Results

- A total of 5522 patients met the study criteria, including 1117 HTE, 2394 treatment experienced, and 2011 treatment naive HIV patients
- Patients in the lowest CD4 strata were more likely to be female, living in the South, HTE or treatment naive, African American, earn less, and have ≥1 AIDS defining condition (Table 2)

### Table 2. Demographics and Clinical Characteristics

HIV cohort, n (%)	CD4 <200 979 (18%)	CD4 200-500 3891 (70%)	CD4 >500 652 (12%)
Female*	172 (18%)	542 (14%)	94 (14%)
South region*	719 (73%)	2619 (67%)	409 (63%)
African American*	292 (30%)	1069 (27%)	146 (22%)
HTE	244 (25%)	789 (20%)	84 (13%)
Treatment experienced	192 (20%)	1799 (46%)	403 (62%)
Treatment naive	543 (55%)	1303 (33%)	165 (25%)
Low income (<$40,000)	226 (23%)	818 (21%)	121 (19%)
Any AIDS-defining conditions*	253 (26%)	302 (8%)	31 (5%)

*$P<0.05$.

All-Cause and HIV-Related HCRU

- All-cause ED visits and inpatient stays were highest among those patients with CD4 <200; rates of inpatients stays were double that of other CD4 strata (Figure 1); a similar trend was seen for HIV-related ED visits, whereas the majority of the inpatient stays were HIV-related
- No differences were seen for ambulatory visits by CD4 strata
- Mortality was higher among the patients in the lowest CD4 strata (6%; <200) vs 2% and 1% among the middle- and high-groups respectively

Figure 1. All-Cause and HIV-Related HCRU by CD4 Strata
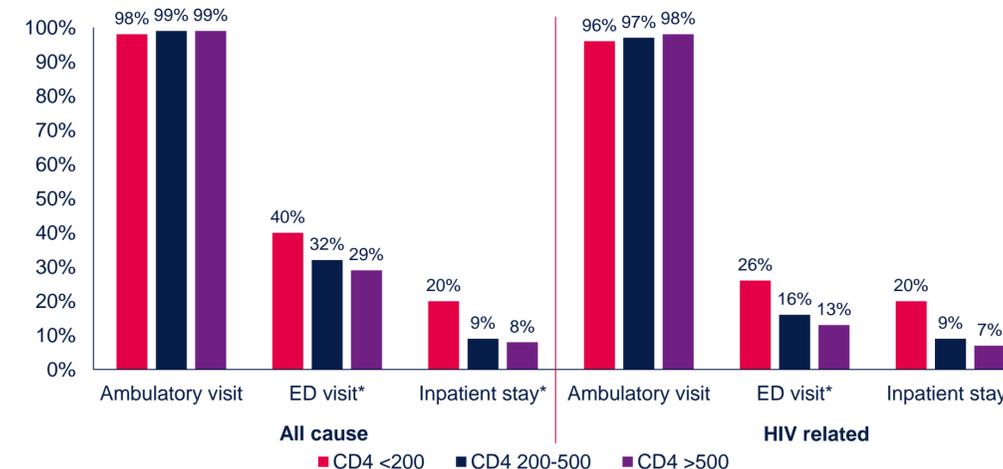
*$P<0.05$.

Healthcare Cost

- Average all-cause total cost among patients with CD4 counts <200 was 51% higher than those with CD4 >500, and their medical cost was 207% higher, primarily driven by inpatient healthcare cost
  - Similar trends were seen for HIV-related care
- Among patients in the lowest CD4 group, average all-cause total cost was highest in the HTE cohort, followed by treatment naive patients, which included higher medical costs than all treatment experienced patients and those with CD4 >200 (Figure 2)

Figure 2. All-Cause Total Cost by Cohort and CD4 Strata
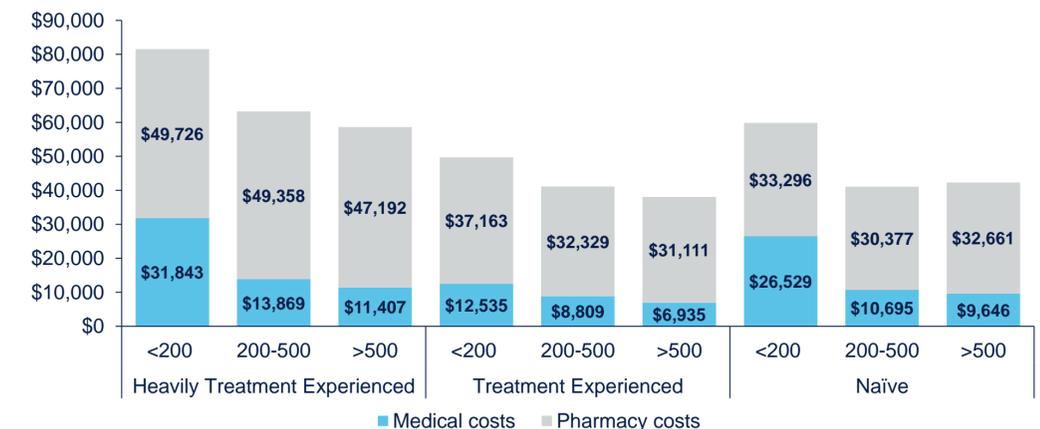
Discussion

- There are still a substantial number of patients with CD4 counts <200 cells/mm,[3] either when diagnosed or living with HIV, that can result in more AIDS-defining conditions, higher mortality risk, and higher all-cause and HIV-related HCRU and cost
- Patients in the lowest CD4 strata tended to have more inpatient stays, which contributed to the higher cost across all cohorts

Conclusions

- These data suggest earlier diagnosis and treatment of patients, along with increased monitoring of more advanced patients, are still needed to prevent worsening outcomes
- People with lower CD4 counts have more hospitalizations and higher mortality rates
- Better control of HIV and measures to improve CD4 will improve patient outcomes

References: 1. DHHS. *Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents With HIV.* 2019. https://files.aidsinfo.nih.gov/contentfiles/lvguidelines/AdultandAdolescentGL.pdf.