CADAP Quality Improvement: Pairwise Comparison of ART Brands Using Median log10(VL) and Median CD4 Counts — A PDSA Approach

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Aim

*To compare twelve **antiretroviral therapy (ART)** brands pairwise on log10 viral load and CD4 count outcomes among participants in the Connecticut AIDS Drug Assistance Program (CADAP).*

Intervention Strategies

- *CADAP provides access to ART for people living with HIV in Connecticut.*
- *Optimizing ART selection within ADAP formularies is critical to achieving viral suppression and improving immune recovery (CD4 counts).*
- *This project applies a Quality Improvement (QI) Plan–Do–Study–Act (PDSA) framework to compare ART brands pairwise on median log10 viral load (VL) and median CD4 counts to inform formulary and patient care decisions.*

Intervention Population

1,429 CADAP Participants

QI Project Team

Mitchell Namias, Pharm.D: CADAP-Primary Investigator
Melinda Vazquez-Yopp: CADAP staff
Leonardo Pereda: Data analyst
Ramon Rodriguez-Santana: Data analyst lead
Africka Hinds: Health Program Supervisor
Marianne Buchelli: Public Health Services Manager

Implementation Activities

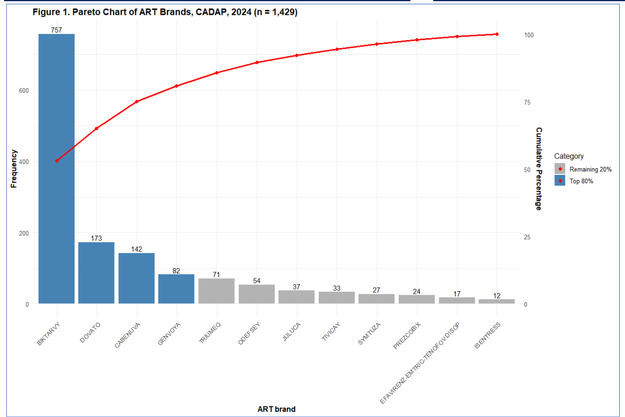
1. **Data Integration:** Linked ADAP prescriptions with VL & CD4 labs.
2. **Baseline Assessment:** Calculated brand-level medians and overall distributions.
3. **Statistical Analysis:** Used Kruskal–Wallis for global testing; Dunn's post-hoc tests for pairwise comparisons.
4. **Stakeholder Engagement:** Shared preliminary results with ADAP formulary and clinical leadership.
5. **Intervention Rollout:** Flagged clients with poorer outcomes, implemented adherence counseling.
6. **Monitoring:** Tracked repeat VL & CD4 labs over 6–12 months.
7. **Dissemination:** Developed poster and shared results for replication in other ADAP programs.

Plan

- *Extract de-identified CADAP ART prescription + lab data (log10VL, CD4).*
- *Use Kruskal–Wallis tests to evaluate overall differences in log10VL and CD4 by ART brand.*
- *Conduct pairwise post-hoc Dunn's tests.*
- *Visualize results with boxplots*

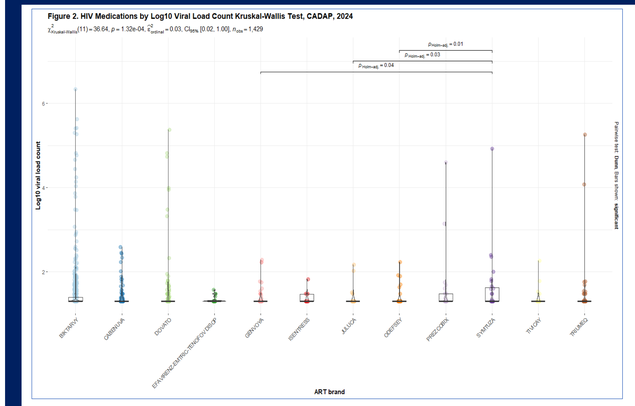
Do

- *Run analysis on most recent 12-month CADAP cohort.*
- *Create ART brands pairwise comparison matrix using **R Programing Language** showing:*
  - *Median log10VL difference*
  - *Median CD4 difference*
  - *Statistical significance*

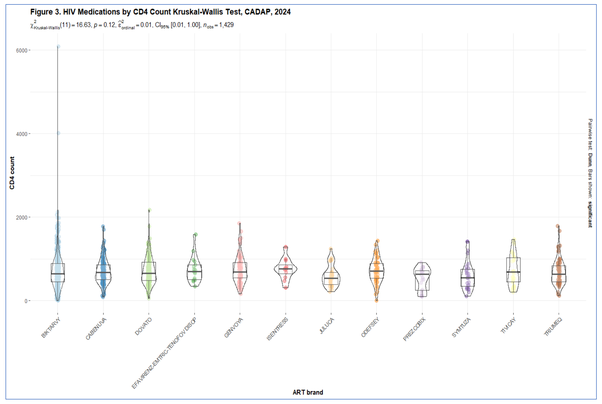


*As seen in **Figure 1**, the most prescribed ART brands were BIKTARVY (53%), DOVATO (12%), CABENUVA (10%) and GENVOYA (6%).*

Study



*As seen in **Figure 2**, significant differences in median log10 viral load were observed between the following ART brands: SYMTUZA and GENVOYA, SYMTUZA and JULUCA, and SYMTUZA and ODEFSEY ($p < 0.05$).*



*As seen in **Figure 3**, no statistically significant differences in median CD4 counts were observed across ART brands ($p > 0.05$).*

- Identify ART brand differences in log10VL and CD4.

Table 1. CADAP Participants Characteristics, 2024

Characteristic	N = 1,429[†]
Age	50 (38, 60)
Gender	
Female	442 (31%)
Male	987 (69%)
Race/Ethnicity	
Black/African American	448 (31%)
Hispanic/Latino	657 (46%)
Some other race	35 (2.4%)
White	289 (20%)
Planning Region (County Equivalent)	
Capital	364 (25%)
Greater Bridgeport	236 (17%)
Lower Connecticut River Valley	47 (3.3%)
Naugatuck Valley	178 (12%)
Northeastern Connecticut	10 (0.7%)
Northwest Hills	19 (1.3%)
South Central Connecticut	297 (21%)
Southeastern Connecticut	80 (5.6%)
Western Connecticut	198 (14%)
Risk Category	
Heterosexual Contact	479 (34%)
Injection Drug Use (IDU)	104 (7.3%)
Male-to-Male Sexual Contact (MSM)	639 (45%)
MSM and IDU	17 (1.2%)
Other	190 (13%)

[†] Median (Q1, Q3); n (%)

Data source: CADAP, 2024

Act

- *Present findings to ADAP formulary and clinical leadership.*
- *Develop QI actions:*
  - *Review formulary prioritization for ART brands with superior outcomes.*
  - *Implement targeted adherence interventions for clients with poorer outcomes.*
  - *Work with medication adherence staff to review Symtuza patients' adherence*
  - *Drug interactions may also be a factor in lower viral suppression.*
  - *Drug resistance may influence viral suppression.*
- *Plan next cycle: stratify analyses by demographics, adherence, and baseline labs.*

*As seen in **Table 1**, The CADAP population included 1,429 individuals with a median age of 50 years (IQR: 38–60).*

Most participants were male (69%), and the largest racial/ethnic group was Hispanic/Latino (46%), followed by Black/African American (31%) and White (20%).

Participants were primarily concentrated in the Capital (25%) and South Central Connecticut (21%) planning regions, with additional representation from Greater Bridgeport (17%), Western Connecticut (14%), and other smaller regions.

In terms of risk, nearly half of participants reported male-to-male sexual contact (45%), while heterosexual contact accounted for 34%. Injection drug use was less common (7.3%), and a small proportion (1.2%) reported both MSM and IDU. About 13% were classified into other risk categories.

Conclusion

- *Significant differences in median log10VL and CD4 exist between ART brands in ADAP.*
- *Brands with better suppression and immune recovery can be prioritized in formularies.*
- *Targeted adherence interventions may improve outcomes for clients experiencing medication issues.*
- *Clients with drug resistances may need more support to achieve viral suppression.*
- *Iterative PDSA cycles ensure ongoing quality improvement and data-driven policy updates.*

Lessons Learned & Impact on 'Pairwise Comparison of ART Brands…'

There are statistically significant differences for viral suppression for certain antiretrovirals, with Symtuza being the standout for this analysis.

More information is needed to find out why CADAP clients taking Symtuza have lower rates of viral suppression. Symtuza has many more drug interactions that other popular antiretrovirals, which may affect viral suppression. Medication adherence and drug resistance may also play a role.

Symtuza is a preferred regimen in the presence of INSTI resistance. Patients with INSTI resistance often have a history of treatment failure or adherence issues. INSTI resistance correlates to reduced likelihood of suppression on alternative regimens, but it is not a causal predictor itself.

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