# The incidence and severity of drug interactions before and after antiretroviral therapy simplification in treatment experienced patients with HIV Infection

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## Background

- More than 70% of the HIV population will be above the age of 50 by the year 2020
- Most are receiving 5 or more medications for common chronic conditions plus their antiretroviral therapy (ART)[1]
- Simplifying ART can improve patient adherence and quality of life[2]
- Limited evidence exists on ART simplification and drug interactions

## Purpose

- The primary objective of this study was to assess changes in the incidence and severity of drug interactions before and after ART simplification in treatment experienced patients.
- Describe ART medication class changes and analyze predictors for achieving drug interaction score reductions.

## Methods

- Observational, retrospective cohort study of patients on ART for HIV infection at a single urban center
- Adults receiving at least 1 concomitant medication and undergoing ART simplification between 6/2014 and 5/2018 were evaluated
- ART regimens pre- and post-simplification were assessed for drug interactions using the University of Liverpool's HIV drug-interaction checker (ULHDIC)
- Scores were generated based on the ULHDIC classification for interaction potential and total drug interaction scores for each patient pre- and post-simplification were calculated
- The average pre-simplification and post-simplification scores were determined and analyzed using a paired t-test
- Predictors for achieving drug interaction score reductions were examined using a multivariable linear regression model

**Table 1. ULHDIC Interaction Assessment and Scoring**

| ULHDIC Interaction Classification | Assigned Interaction Score |
|---|---|
| No interaction expected | 0 |
| Potential interaction | 1 |
| Do not co-administer | 2 |

## Results

**Table 2. Baseline characteristics of patients pre-simplification**

| Characteristics | Total (n = 99) |
|---|---|
| Median age (IQR) - years | 54 (49-61) |
| Male sex - no. (%) | 78 (79) |
| Race - no. (%) | |
| Black or African American | 54 (55) |
| White or Caucasian | 38 (38) |
| Median duration of infection (IQR) - years | 16 (9-22) |
| Median duration of ART (IQR) - years | 10 (5-16) |
| Median CD4⁺ cell count (IQR) - cells/mm³ | 516 (374-737) |
| HIV-1 RNA < 50 copies/mL - no. (%) | 81 (82) |
| Median number of concomitant medications (IQR) | 4 (2-6) |

**Figure 1. ART Pre- and Post Simplification**

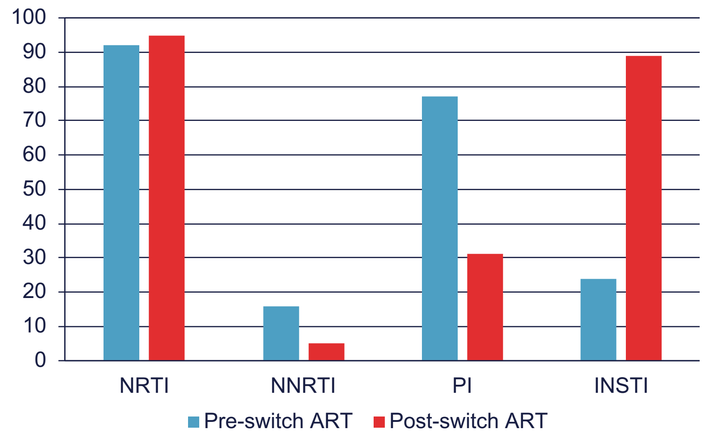


**Table 3. Pre- and post-simplification medication changes**

| | Pre-Switch | Post-Switch | Difference |
|---|---|---|---|
| Mean interaction score | 3.67 | 2.24 | - 1.44* |
| Switching off PI | 3.88 | 1.25 | - 2.63 |
| Switching to an INSTI | 3.79 | 2.31 | - 1.47 |
| Average # ART pills/day | 3.65 | 1.52 | - 2.13 |

*$CI_{95}$ [-1.98] – [-0.90]; p = 0.001

**Table 4. Multivariable linear regression model: Predictors for achieving score reductions with ART simplification**

| Factor | Predicted Score Change | p-value |
|---|---|---|
| Concomitant medications* | - 1.03 ($CI_{95}$ 1.01-1.05) | .004 |
| Discontinuing a protease inhibitor | - 1.47 ($CI_{95}$ 1.26-1.71) | .0001 |
| Switching to bictegravir or dolutegravir | - 1.27 ($CI_{95}$ 1.09-1.48) | .003 |

*Score change is predicted per concomitant medication

## Conclusion

- ART simplification decreased the incidence and severity of drug-drug interactions in persons living with HIV (PLWH)
- Simplification led to lower pill burdens consistent with previous studies, which may improve treatment convenience and adherence
- Although there was an overall decrease in drug interaction scores post-simplification, interactions emerged indicating the continued importance of ART drug interaction monitoring
- Future studies can be directed toward analyzing which drug interactions commonly arise for patients taking simplified ART

## Limitations

- Subjects were primarily male (79%)
- Accuracy of the data relied on completeness of the medical record
- Single centered study could limit the external validity of the results
- Clinical significance of interactions is not reflected in the drug interaction score

## References

1. McNicholl IR, Gandhi M, Hare CB, Greene M, Pierluissi E. A pharmacist-led program to evaluate and reduce polypharmacy and potentially inappropriate prescribing in older HIV-positive patients. Pharmacotherapy. 2017;37:1498-1506.
2. Yager J, Faragon J, McGuey L, et al. Relationship between single tablet antiretroviral regimens and adherence to antiretroviral and non-antiretroviral medications among veterans' affairs patients with Human Immunodeficiency Virus. AIDS Patient Care STDS. 2017;31(9): 370-376.