



HOSPITAL

University Hospital
Basel

Adverse Events Due to Inappropriate Prescribing in Older Adults with HIV

Contact:
Mark Cinquegrani, PharmD
mcinquegrani@salud.unm.edu



COLLEGE
OF PHARMACY

Mark Cinquegrani, PharmD^{1,2}; M. Gabriela Cabanilla, PharmD, PhC²; Keenan L. Ryan, PharmD, PhC²; Catia Marzolini, PharmD, PhD³; E. Eunice Choi, MS⁴; Jessica Conklin, PharmD, BCACP¹; Cory Zarick, PharmD¹; Renee-Claude Mercier, PharmD, PhC, BCPS-ID, FCCP¹; Bernadette Jakeman, PharmD, PhC, BCPS, AAHIVP¹

¹University of New Mexico College of Pharmacy, Albuquerque, NM, USA, ²University of New Mexico Hospitals, Albuquerque, NM, USA; ³Division of Infectious Diseases and Hospital Epidemiology, University Hospital Basel, Basel, Switzerland; ⁴University of New Mexico Health Sciences Center, Clinical and Translational Sciences Center, Albuquerque, NM, USA

Background

- Advances in HIV therapy has led to improved viral suppression and extended life expectancy in people with HIV (PWH).¹⁻²
- PWH are aging and experience age-related comorbidities as well as physiological changes leading to a higher risk for polypharmacy, drug-drug interactions, inappropriate prescribing and related adverse events (AE).³⁻⁶
- Prior studies have highlighted a growing concern for inappropriate prescribing in older PWH.⁷

Objective

The objective of this study was to examine the prevalence of AEs resulting from inappropriate prescribing in PWH ≥ 65 years of age.

Hypothesis

Medication-related adverse events due to Inappropriate prescribing is common in people with HIV ≥ 65 years of age.

Methods

Study Design

Retrospective chart review

Setting

The University of New Mexico Truman Health Services (THS) clinic in Albuquerque, NM, USA serves approximately 1400 patients with HIV

Study Population

Adults ≥ 65 years of age with HIV who received HIV care between January 1, 2015 and August 21, 2018 were included for analysis if they had received ≥ 1 potentially inappropriate prescriptions (PIP). See *Measures of Inappropriate Prescribing*

Primary Outcomes

- Adverse events related to PIPs (list developed by investigators based on PIP criteria)
- Severity of AEs (classified using the WHO scale for grade of AEs when possible)
- Hospitalizations

Measures of Inappropriate Prescribing

American Geriatric Society Beers Criteria⁸

Screening Tool of Older Persons Prescriptions (STOPP)⁹

Screening Tool to Alert to Right Treatment (START)⁹

Antiretroviral Therapy-related Drug-Drug Interaction*

Non-ART Drug-Drug Interaction**

Inappropriate prescriptions were identified from a patient's most recent medication list.

*University of Liverpool's HIV interaction checker was used for interaction screening

**Lexicomp interaction checker was used for interaction screening

Results

104 patients met inclusion criteria (≥ 1 PIP)

- 51 patients (49.0%) met criteria for ≥ 1 PIP using the Beers Criteria
- 60 patients (57.7%) met criteria for ≥ 1 PIP using the STOPP Criteria
- The most common inappropriately prescribed medications included NSAIDs, benzodiazepines, and first-generation antihistamines

Table 1. Patient Characteristics (n=104)

Characteristic	n (%) or median (IQR)
Age (yrs)	68 (66, 70)
Male gender	92 (88.5%)
Race	
White	90 (86.5%)
Black	5 (4.8%)
American Indian or Alaskan Native	4 (3.9%)
Declined to answer	5 (4.8%)
Ethnicity	
Hispanic/Latino	29 (27.9%)
Non-Hispanic	67 (64.4%)
Unknown	8 (7.7%)
BMI (kg/m ²)	24.7 (22, 28)
SCr (mg/dL)	1.2 (1.0, 1.4)
Years living with HIV	22 (14, 28)
CD4 cell count (cells/mm ³)	589 (431, 819)
Undetectable HIV viral load (<20 copies/mL)	92 (88.5%)
Polypharmacy (≥ 5 non-HIV medications)	104 (100%)
Total number of non-HIV medications	8 (6, 12)
ART regimen	
INSTI-based regimen	72 (69.2%)
PI-based regimen	8 (7.7%)
NNRTI-based regimen	14 (13.5%)
Non-traditional regimen	10 (9.6%)

BMI = body mass index; SCr = serum creatinine; INSTI = integrase strand inhibitor; PI = protease inhibitor; NNRTI = non-nucleoside reverse transcriptase inhibitor

Table 2. Patients with Adverse Outcomes Potentially Related to Inappropriate Prescribing (n=104)

Adverse Outcome	n (%)
≥ 1 Adverse event	30 (28.8%)
≥ 1 Severe event	20 (69.0%)
≥ 1 Emergency department visit	14 (13.5%)
≥ 1 Hospital admission	2 (1.9%)

- 30 patients experienced 53 adverse events related to potentially inappropriately prescribed medication
- Almost 50% of the patients who had an adverse event required an ED visit
- All events received a designation of at least "Possible" on the Naranjo Scale (Min Score 2/9, Max Score 7/9)

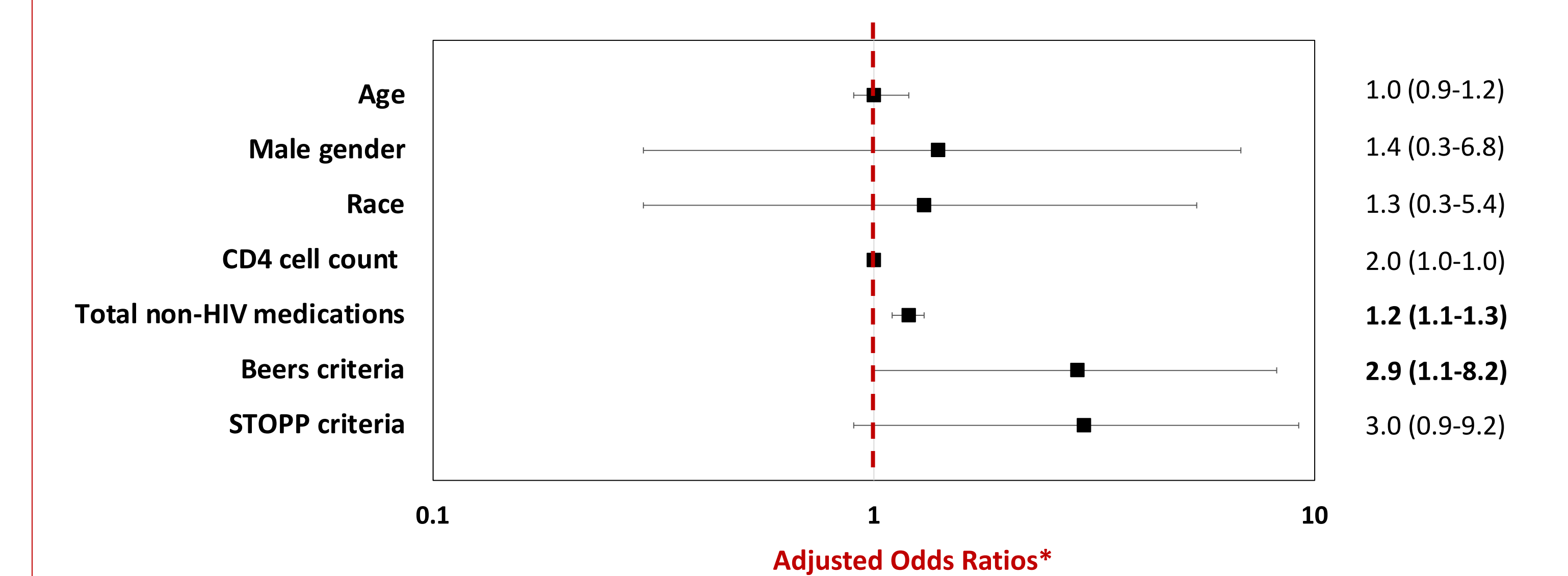
Table 3. Type of Adverse Event

Adverse event	n
Fall	28
Bleed	7
Fracture	5
Anticholinergic side effects	2
Acute kidney injury	1
Hypotension	1
Hyponatremia	1
Infection	1
Other	7

Results

Figure 1. Factors Associated with Adverse Events

In the multivariate analysis, the likelihood of having an adverse effect significantly increased as the total number of non-HIV medication increased or when being prescribed a medication fulfilling the Beers criteria of STOPP criteria.



*Beers and STOPP were modeled separately adjusting for age, gender, race, CD4 count, and total number of non-HIV medications

Using logistic regression to find best fit, it was determined that < 7 non-HIV medications minimized risk of an adverse event.

Table 4. Adverse Event in Patients on < 7 vs ≥ 7 Non-HIV Medications (n=104)

# non-HIV medications	Patients with AE	Patients without AE	OR (95% CI)*
< 7 medications	5	37	Reference
≥ 7 medications	25	37	5.4 (1.8-16.2)

*Adjusted for age, gender, race, and CD4 cell count (p=0.003); AE = Adverse Event

Limitations

- Results may underestimate AEs due to PIP
 - Investigators collected only most concerning AEs related to PIP
 - Not all adverse event reporting is captured in electronic medical records.
- Medication adherence was not evaluated.
- Co-morbidities were not included in analysis
- Adverse events difficult to attribute solely to PIP.
- There is overlap between inappropriate prescribing criteria.
- Use of some medications that are deemed inappropriate may still be appropriate based on risk/benefit considerations.

Conclusions

PIP and related AEs are common in older PWH. Interventions to prevent harm including medication reconciliation, medication review, and medication prioritization according to the risks/benefits of individual patients are warranted.

References

- Gleason et al. Clinical Interventions in Aging 2013;8:749-763;
- Guaraldi et al. AIDS. 2017;31:S129-S135;
- Holtzman et al. Journal of General Internal Medicine. 2013;28(10):1302-1310;
- Nacheva et al. AIDS. 2012;26:S39-S53;
- Shah et al. Clinical Interventions in Aging. June 2013;7:49;
- Smith et al. AIDS. 2017;31:S173-S184;
- McNicholl et al. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2017;37(12):1498-1506;
- 2019 American Geriatrics Society Beers Criteria® Update Expert Panel. J Am Geriatr Soc. 2019;67(4):674-694. doi:10.1111/jgs.15767;
- O'Mahony et al. Age and Ageing. 2014;44(2):213-218.